ENVIRONMENTAL ASSESSMENT
SECTION 404(b) EVALUATION
AND FINDING OF NO SIGNIFICANT IMPACT
FOR THE MAINTENANCE DREDGING
OF THE

BLACK ROCK HARBOR-CEDAR CREEK FEDERAL NAVIGATION CHANNEL,

BRIDGEPORT, CONNECTICUT

JULY 1982

US Army Corps of Engineers
New England Division

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14. ABSTRACT
Maintenance dredging is proposed for the Black Rock Harbor-Cedar Creek Federal navigation channel and the western portion of the Bridgeport Harbor Anchorage Area. Approximately 10,000 to 15,000 cubic yards (c.y.) of sediment from the central section of the channel would be dredged by a hydraulic dredge and deposited onto an intertidal mudflat area which would be confined by a steal bulkhead. An upland-intertidal marsh habitat would be created for a proposed field research program (Field Verification Program (FVP)) which would study the long term impacts of this type of disposal. The remainder of the sediments derived from the central section of the channel (70,000 c.y.) would be dredged by clamshell dredge and deposited in an uncapped mound at the Central Long Island Sound Disposal Site, near New Haven. This deposit would also be studied under the FVP. The remainder of the sediments from the upper and lower sections of the channel, sediment from private dredging areas, and the sediments from the Bridgeport Harbor Anchorage Area would be disposed at a separate capped mound at the Central Long Island Sound Disposal area. The FVP study may include a comparison of the uncapped and capped mounds.

15. SUBJECT TERMS
Black Rock Harbor, Hydrology, Sediments, Water Quality, Dredging, Swamps, Long Island Sound Disposal

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FINDING OF NO SIGNIFICANT IMPACT

The Environmental Assessment for this project is attached and describes the proposed action, need for the project, alternatives to the project, affected environment and environmental consequences.

Implementation of the proposed project will not require a significant commitment of physical, natural or human resources. Coordination among all parties during the planning process has resulted in the recommended maintenance proposal. The impacts have been outlined in the assessment and are summarized below.

Impacts of dredging and disposal operations would include a temporary and local increase in suspended solids and dissolved sediment contaminants in the harbor and at the disposal sites. These impacts would not significantly affect the water quality or organisms in the vicinity of these activities. Dredging would take place prior to the sensitive period for shellfish. Organisms removed by the dredge or buried upon disposal would perish. Recolonization would occur in the project areas soon after operations ceased. Bioassay tests indicated that disposal of the sediments would not cause any acute chemical impacts to organisms in the vicinity of the discharge area. Bioaccumulation tests exhibited potential uptake of certain sediment contaminants by clams and marine worms. The relative tissue levels in the clams were well below U.S. Food and Drug Administrations's action levels for shellfish. Uptake by sandworms may be considered insignificant to the ecosystem based on the low level of uptake or the fact that the substance has not been observed to magnify to higher trophic levels in the marine food chain. On site studies at the disposal areas would be performed by the Waterways Experiment Station of the Corps of Engineers, the Environmental Research Laboratory, Narragansett, of the Environmental Protection Agency and the Disposal Area Monitoring System Program of the Corps of Engineers, New England Division over the next five years. These studies would indicate any potential adverse effects. If such impacts are detected, mitigation measures would be implemented promptly.

There does not appear to be any remaining major environmental problems, conflict or disagreement in implementing the proposed work. I have determined that implementation of the proposed action will not have a significant impact on the human environment and, therefore, will not require an Environmental Impact Statement.

7 July 1982
DATE

C. E. Edgar III
C. E. EDGAR, III
Colonel, Corps of Engineers
Division Engineer

ENVIRONMENTAL ASSESSMENT/SECTION 404(b) EVALUATION

AND FINDING OF NO SIGNIFICANT IMPACT

FOR THE MAINTENANCE DREDGING OF THE BLACK ROCK HARBOR-

CEDAR CREEK FEDERAL NAVIGATION CHANNEL,

BRIDGEPORT, CONNECTICUT

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SUMMARY

Maintenance dredging is proposed for the Black Rock Harbor-Cedar Creek Federal navigation channel and the western portion of the Bridgeport Harbor Anchorage Area. Approximately 10,000 to 15,000 cubic yards (c.y.) of sediment from the central section of the channel would be dredged by a hydraulic dredge and deposited onto an intertidal mudflat area which would be confined by a steel bulkhead. An upland-intertidal marsh habitat would be created for a proposed field research program (Field Verification Program (FVP)) which would study the long term impacts of this type of disposal. The remainder of the sediments derived from the central section of the channel (70,000 c.y.) would be dredged by clamshell dredge and deposited in an uncapped mound at the Central Long Island Sound Disposal Site, near New Haven. This deposit would also be studied under the FVP. The remainder of the sediments from the upper and lower sections of the channel, sediment from private dredging areas, and the sediments from the Bridgeport Harbor Anchorage Area would be disposed at a separate capped mound at the Central Long Island Sound Disposal area. The FVP study may include a comparison of the uncapped and capped mounds.

Impacts from intertidal mudflat disposal would be generally short term and localized to the harbor. Dredging and disposal would increase turbidity and release sediment contaminants into the water column in Cedar Creek. Downstream shellfisheries in the outer harbor area could be temporarily impacted by the short term release of sediment contaminants. However, the dredging is scheduled to occur prior to the sensitive shellfish period (1 June 1983) and, therefore, should not be a problem.

Disposal at the Central Long Island Sound Disposal Site would bury benthic organisms at the discharge area (250 foot radius) around each disposal mound. Activity would also cause short term and localized increases in turbidity and dissolved sediment contaminants. Bioassay tests have indicated that disposal activities would not be toxic to organisms near the discharge area. Bioaccumulation tests indicated uptake of petroleum hydrocarbons (PCH's), polychlorinated biphenyls (PCB's) and the pesticide DDT. However, the magnitude of uptake of PCB's and DDT by potentially human consumable clams were well below U.S. Food and Drug Administration Action levels for fish and shellfish. Uptake of the contaminants by sandworms may be considered insignificant to the ecosystem based on the low level of uptake or the fact that the substance has not been observed to magnify to higher trophic levels in the marine food chain. On site studies at the disposal site would determine the potential of long term impacts. If any adverse impacts due to the disposal activity are detected, the uncapped mound would be capped promptly.

I. PROJECT DESCRIPTION

Maintenance dredging is proposed in the Black Rock Harbor - Cedar Creek navigation channel. The Federally authorized channel dimensions are 18 feet deep at mean low water (mlw) and 100 to 200 feet wide from the 18-foot depth contour in Black Rock Harbor to the heads of both the East and West Branches of Cedar Creek, a distance of approximately 2.4 miles. (Figures 1-5). The channel will be maintained to a depth of 17 feet with the 200 foot wide areas reduced to 150 feet. The existing 150 and 100 foot wide areas will not be changed. Providing these dimensions will require the removal of approximately 210,000 cubic yards of material. This estimate is based on a 1981 survey. A small amount of dredging is also proposed in the western half of the 25 foot anchorage in Bridgeport Harbor (Figures 1 & 6). Removal of 30,000 cubic yards of material will provide a depth of 35 feet at mean low water throughout this portion of the anchorage. Most of this portion of the anchorage was deepened to 35 feet when it was used as a borrow site during construction of Interstate-95.

In conjunction with this dredging proposal, the Environmental Protection Agency, Environmental Research Laboratory Narragansett (ERLN) will participate in a joint research program with this office and the U.S. Army Engineer Waterways Experiment Station (WES) to apply newly developed environmental risk assessment procedures in the management and disposal of dredged materials in the marine environment. A five-year integrated laboratory and field research program, called the Field Verification Program (FVP) has been designed to validate the predictive accuracy of laboratory testing of dredged materials in terms of environmental impacts of both aquatic (Central Long Island Sound Disposal Area), and tidal/upland disposal (bulkheaded cove area within the harbor). ERLN will be responsible for aqustic studies; WES will conduct the upland/wetland studies and NED will provide the project with its attendant engineering requirements (dredging, disposal, and bulkheading the cove site) as well as the field support for both laboratories via the DAMOS Program. The FVP will be accomplished by conducting laboratory tests under simulated real time field conditions concurrent with in situ field observations at the disposal sites. ERLN has developed an expertise in risk assessment of toxic materials in the marine and estuarine environments. Recent accomplishments in research and development have provided promising short-term predictive methods for assessing contaminant effects on biological communities and populations that can be applied to a thorough and practical characterization of dredged materials. These tests will form part of a risk assessment to provide a predictive estimate of the fate and effects of dredged materials which can be used to make management decisions.

The research program consists of the following phases:

(1) the application of existing laboratory and field assessment techniques to dredged material characterization and disposal site monitoring;

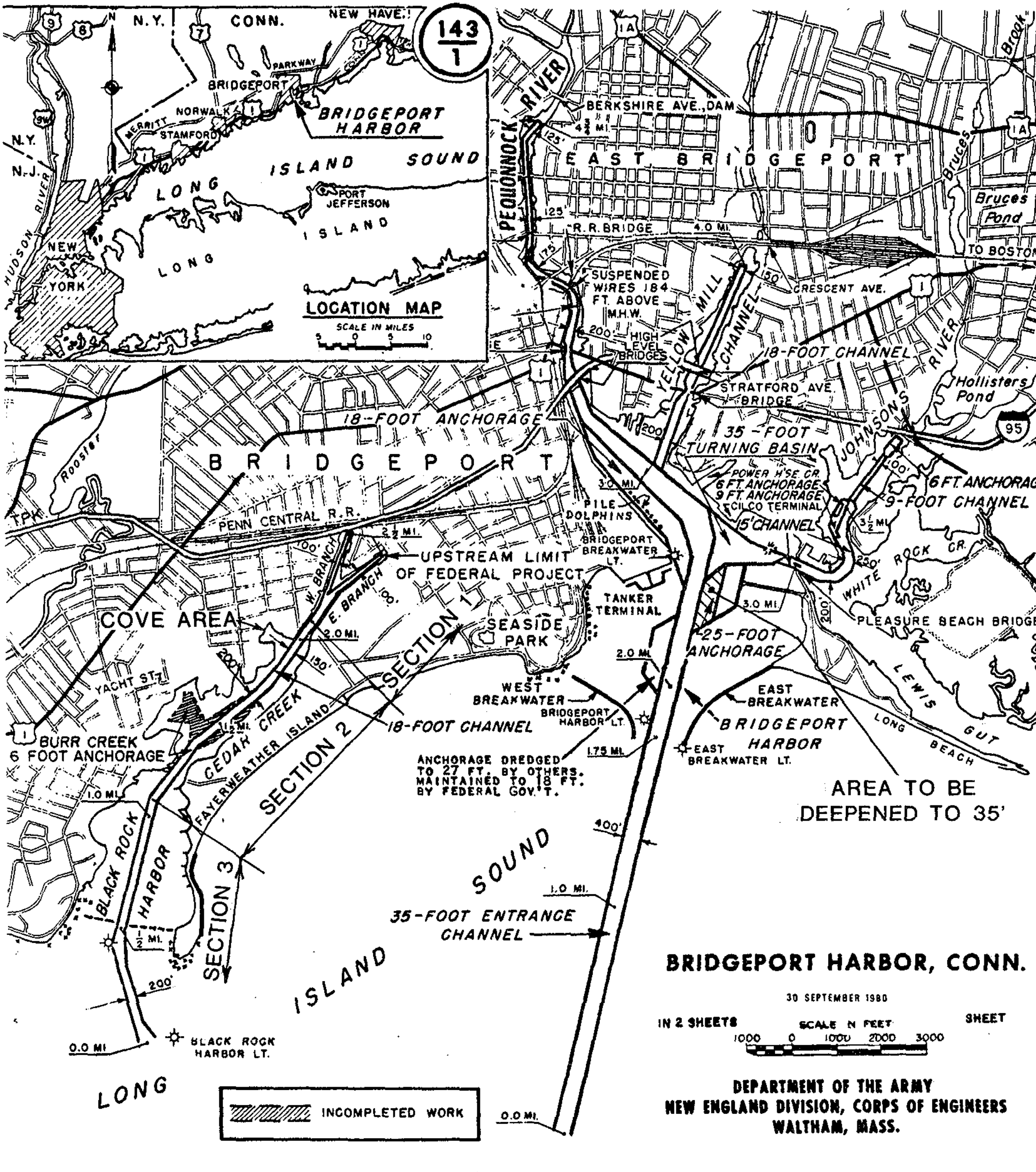

LOCATION MAP
SCALE IN MILES
BRIDGEPORT HARBOR
LONG ISLAND SOUND
EAST BRIDGEPORT
BRIDGEPORT
PEQUONNOCK RIVER
BERKSHIRE AVE. DAM
R.R. BRIDGE
SUSPENDED WIRES 184 FT. ABOVE M.H.W.
HIGH LEVEL BRIDGES
YELLOW MILL CHANNEL
18-FOOT CHANNEL
STRATFORD AVE. BRIDGE
18-FOOT ANCHORAGE
35-FOOT TURNING BASIN
POWER H'SE. CR.
6 FT. ANCHORAGE
9 FT. ANCHORAGE
CILCO TERMINAL
15' CHANNEL
JOHNSONS RIVER
6 FT. ANCHORAGE
9-FOOT CHANNEL
PENN CENTRAL R.R.
UPSTREAM LIMIT OF FEDERAL PROJECT
PILE DOLPHINS
BRIDGEPORT BREAKWATER LT.
TANKER TERMINAL
COVE AREA
SEASIDE PARK
25-FOOT ANCHORAGE
PLEASURE BEACH BRIDGE
WHITE ROCK CR.
WEST BREAKWATER
BRIDGEPORT HARBOR LT.
EAST BREAKWATER
EAST BREAKWATER LT.
18-FOOT CHANNEL
BURR CREEK 6 FOOT ANCHORAGE
CEDAR CREEK
FAYERWEATHER ISLAND
SECTION 1
SECTION 2
SECTION 3
ANCHORAGE DREDGED TO 27 FT. BY OTHERS. MAINTAINED TO 18 FT. BY FEDERAL GOV'T.
AREA TO BE DEEPENED TO 35'
LONG BEACH
LEWIS GUT
BLACK ROCK HARBOR
BLACK ROCK HARBOR LT.
35-FOOT ENTRANCE CHANNEL
INCOMPLETED WORK
BRIDGEPORT HARBOR, CONN.
30 SEPTEMBER 1980
IN 2 SHEETS
SCALE IN FEET
SHEET
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

FIGURE 1

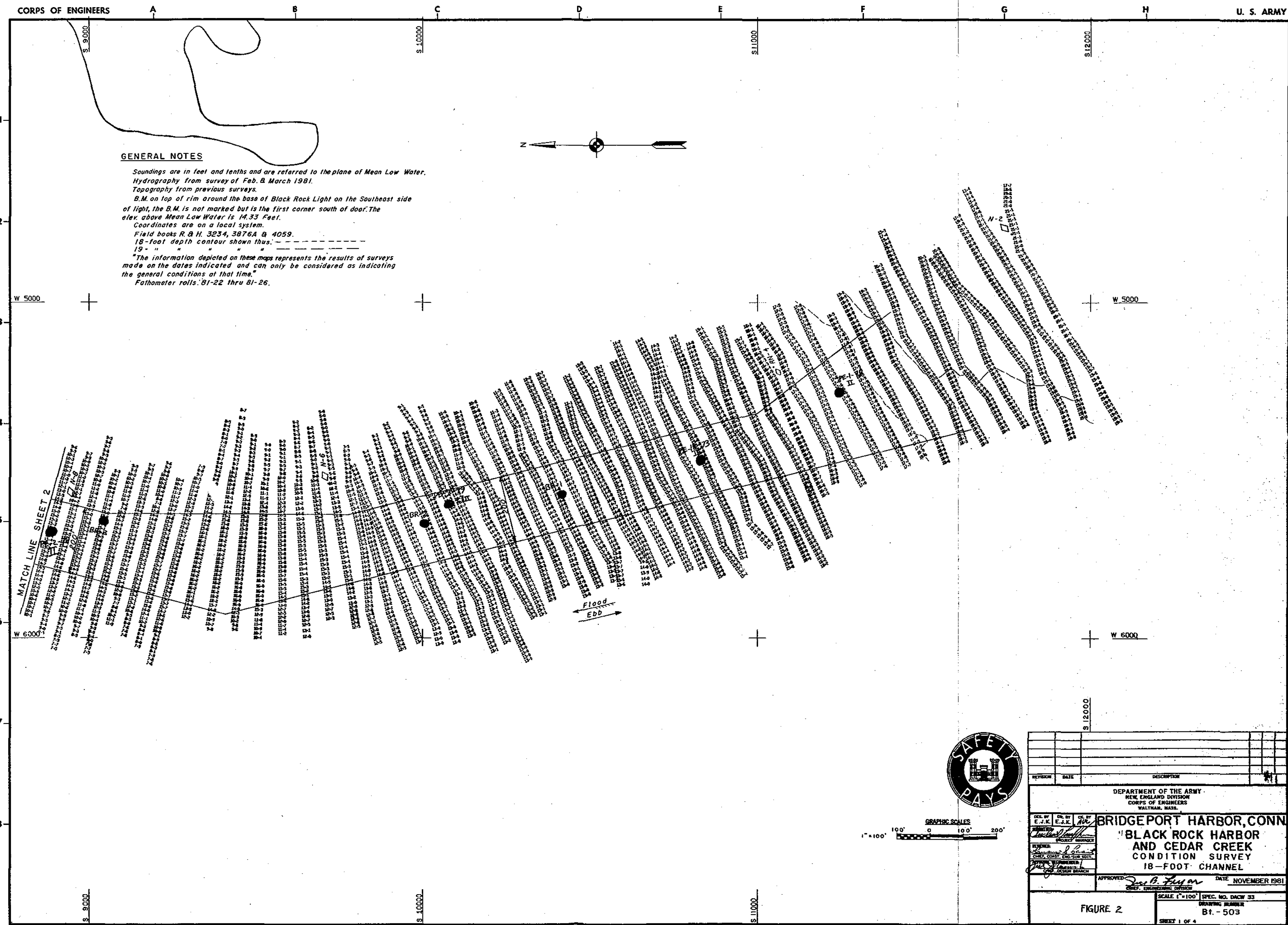
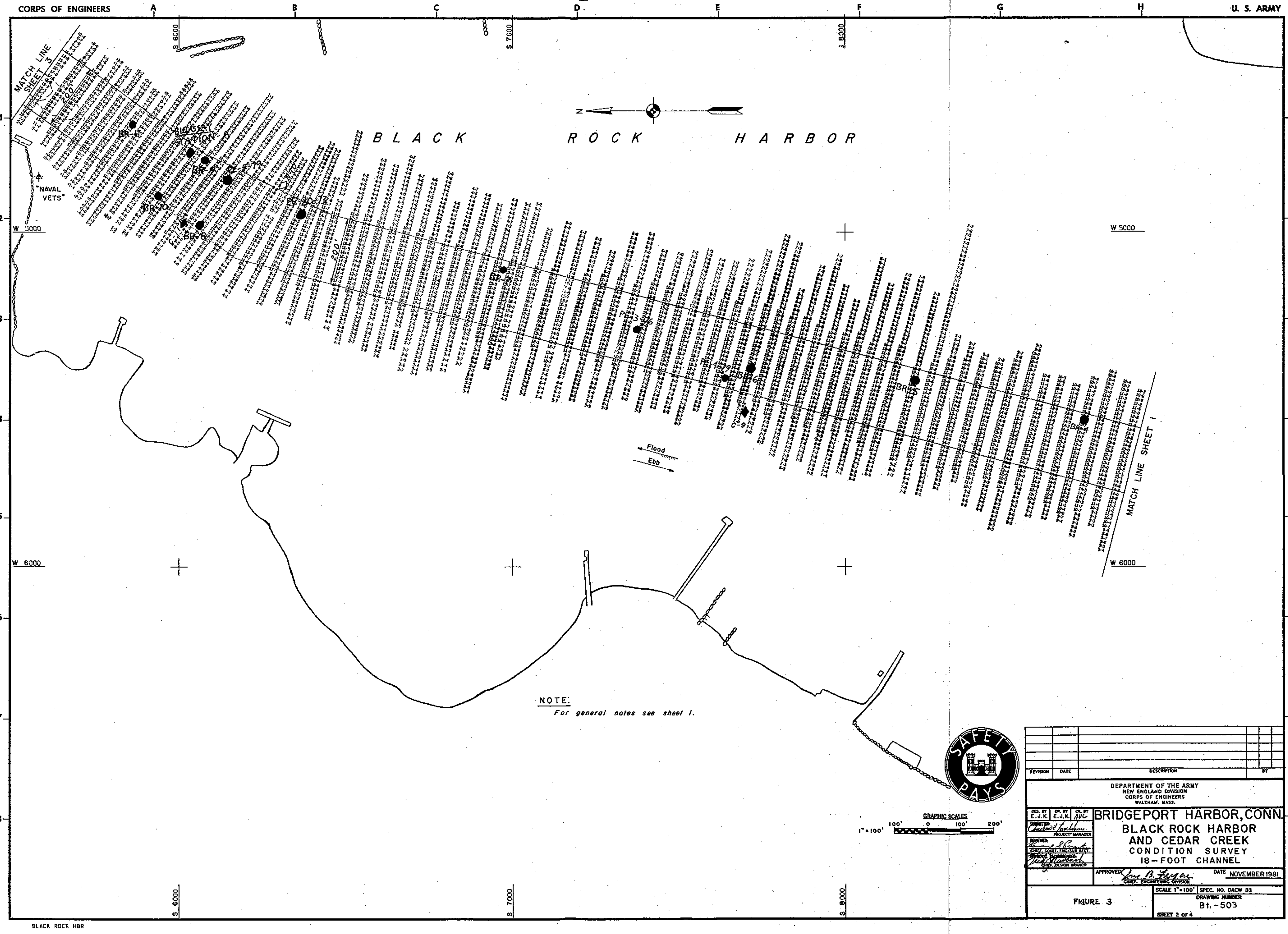


FIGURE 2

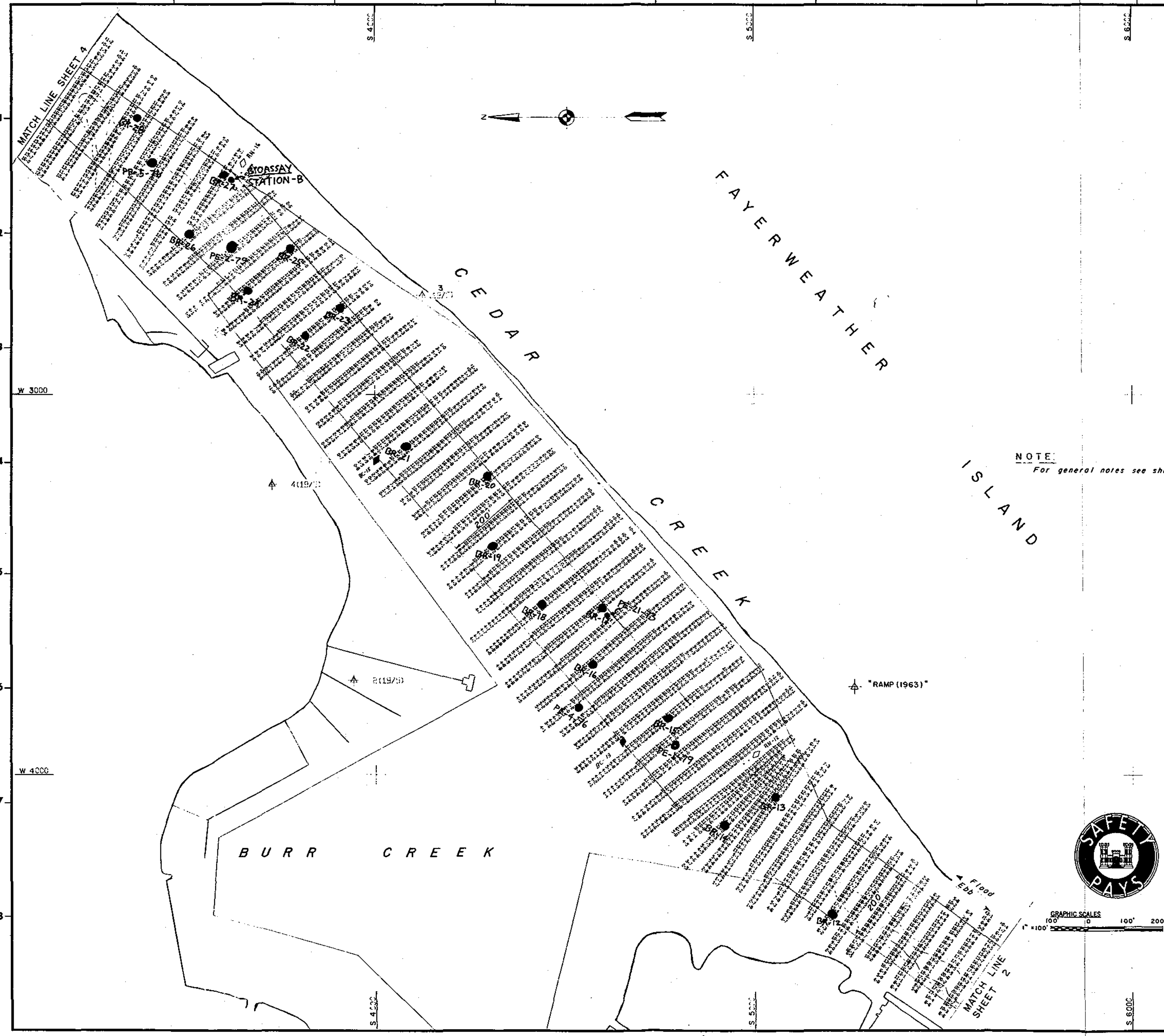
BLACK ROCK HBR



CORPS OF ENGINEERS
U. S. ARMY
BLACK ROCK HARBOR
MATCH LINE SHEET 3
MATCH LINE SHEET 1
"NAVAL VETS"
Flood
Ebb
W 5000
W 6000
S 6000
S 7000
S 8000
NOTE:
For general notes see sheet 1.
SAFETY PAYS
GRAPHIC SCALES
1" = 100'
REVISION
DATE
DESCRIPTION
BY
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.
BRIDGEPORT HARBOR, CONN.
BLACK ROCK HARBOR
AND CEDAR CREEK
CONDITION SURVEY
18-FOOT CHANNEL
PROJECT MANAGER
APPROVED
CHIEF, ENGINEERING DIVISION
DATE NOVEMBER 1981
SCALE 1" = 100'
SPEC. NO. DACW 33
DRAWING NUMBER
B1.-503
SHEET 2 OF 4
BLACK ROCK HBR

FIGURE 3

CORPS OF ENGINEERS U. S. ARMY



DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.

BRIDGEPORT HARBOR, CONN.
BLACK ROCK HARBOR AND CEDAR CREEK
CONDITION SURVEY
18-FOOT CHANNEL

DATE NOVEMBER 1981

SCALE 1" = 100' SPEC. NO. DACW 33

DRAWING NUMBER Bt. - 503

SHEET 3 OF 4

FIGURE 4

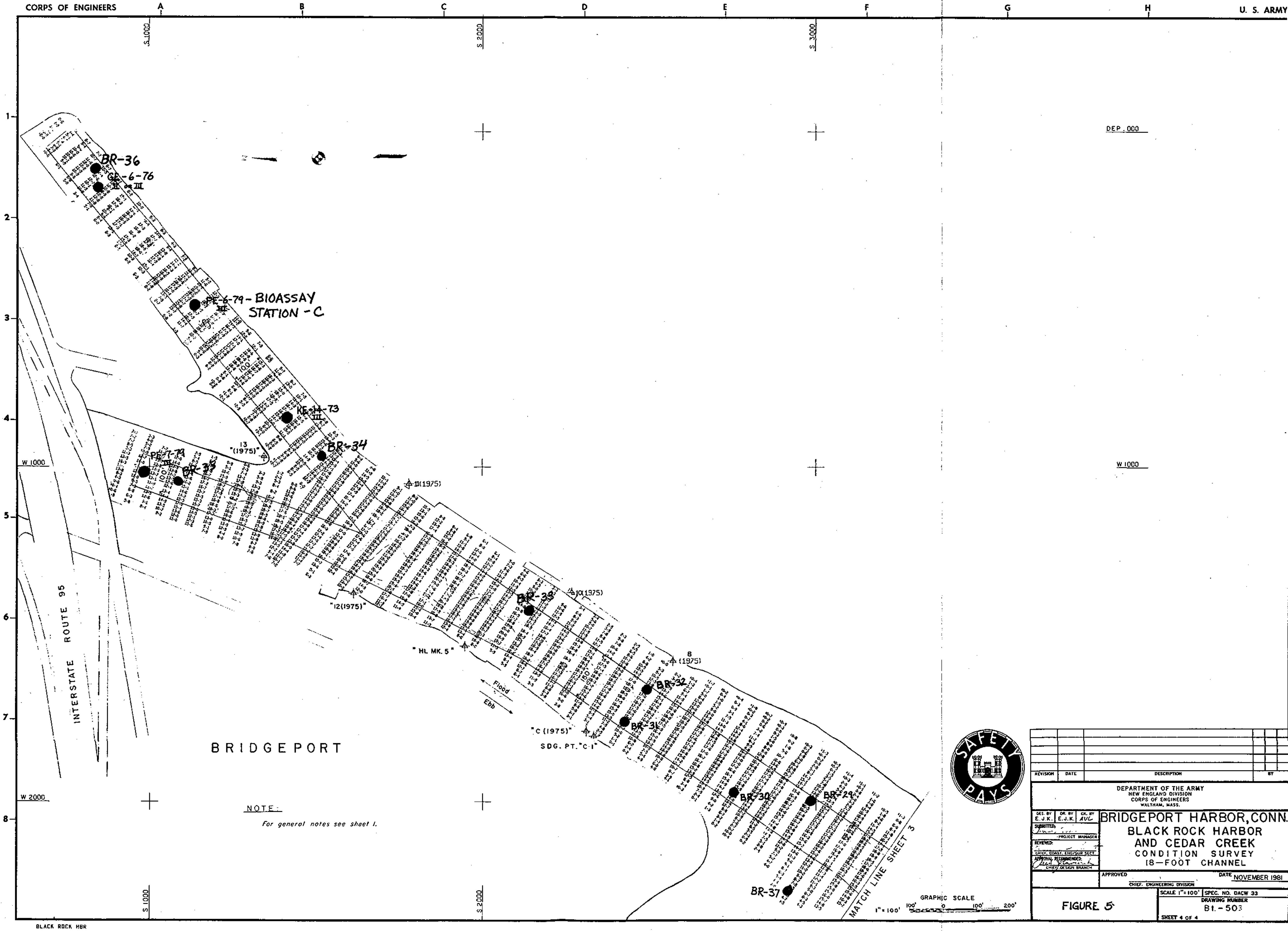

CORPS OF ENGINEERS
U. S. ARMY
A
B
C
D
E
F
G
H
S 1000
S 2000
S 3000
DEP. 000
W 1000
W 2000
BR-36
GE-6-76
PE-6-79 - BIOASSAY STATION - C
KE-11-73
BR-34
BR-35
PE-7-79
"13 (1975)"
11(1975)
"12(1975)"
BR-33
10(1975)
"HL MK. 5"
Flood
Ebb
8 (1975)
BR-32
BR-31
"C (1975)"
SDG. PT. "C-1"
BR-30
BR-29
BR-37
MATCH LINE SHEET 3
INTERSTATE ROUTE 95
BRIDGEPORT
NOTE:
For general notes see sheet 1.
GRAPHIC SCALE
1" = 100'
SAFETY PAYS
REVISION
DATE
DESCRIPTION
BY
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.
DES. BY E.J.K.
DR. BY E.J.K.
CK. BY AVC
SUBMITTED:
PROJECT MANAGER
REVIEWED:
CHIEF, COAST. ENGINEERING SECT.
APPROVAL RECOMMENDED:
CHIEF, DESIGN BRANCH
BRIDGEPORT HARBOR, CONN.
BLACK ROCK HARBOR
AND CEDAR CREEK
CONDITION SURVEY
18-FOOT CHANNEL
APPROVED
CHIEF, ENGINEERING DIVISION
DATE NOVEMBER 1981
SCALE 1" = 100'
SPEC. NO. DACW 33
DRAWING NUMBER
B1.-503
SHEET 4 OF 4
BLACK ROCK HBR

FIGURE 5

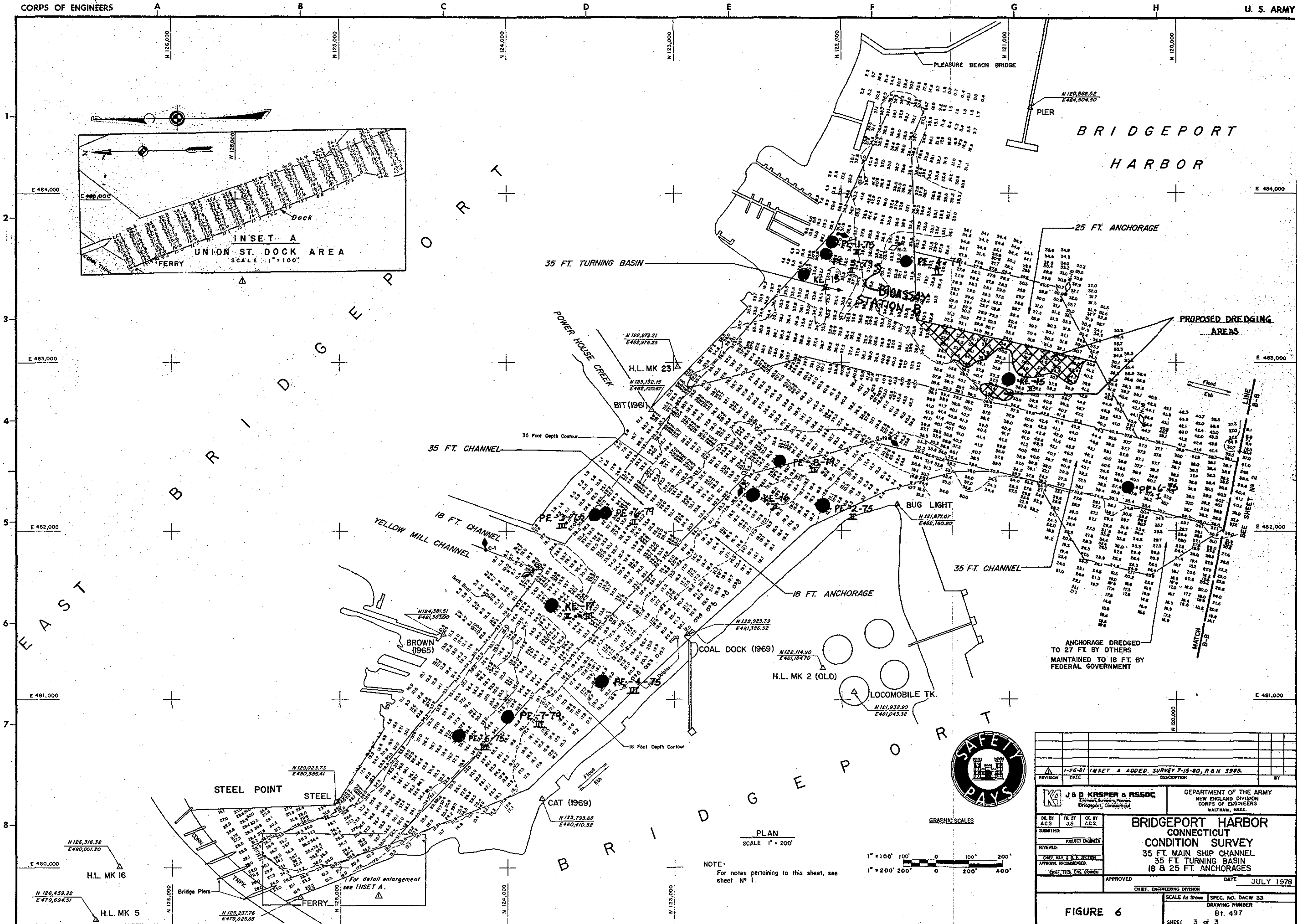

CORPS OF ENGINEERS
U. S. ARMY
BRIDGEPORT HARBOR
EAST BRIDGEPORT
BRIDGEPORT
INSET A
UNION ST. DOCK AREA
SCALE: 1" = 100'
Dock
FERRY
PLEASURE BEACH BRIDGE
PIER
25 FT. ANCHORAGE
35 FT. TURNING BASIN
BIOASSAY STATION B
PROPOSED DREDGING AREAS
POWER HOUSE CREEK
H.L. MK 23
BIT (1961)
35 Foot Depth Contour
35 FT. CHANNEL
18 FT. CHANNEL
YELLOW MILL CHANNEL
BUG LIGHT
18 FT. ANCHORAGE
BROWN (1965)
COAL DOCK (1969)
H.L. MK 2 (OLD)
LOCOMOBILE TK.
ANCHORAGE DREDGED TO 27 FT. BY OTHERS
MAINTAINED TO 18 FT. BY FEDERAL GOVERNMENT
18 Foot Depth Contour
STEEL POINT
STEEL
CAT (1969)
H.L. MK 16
H.L. MK 5
Bridge Piers
FERRY
For detail enlargement see INSET A.
PLAN
SCALE 1" = 200'
NOTE:
For notes pertaining to this sheet, see sheet Nº 1.
GRAPHIC SCALES
MATCH LINE B-B SEE SHEET Nº 2
SAFETY PAYS
1-26-81 INSET A ADDED. SURVEY 7-15-80, R&H 3985.
J & D KASPER & ASSOC.
DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION
CORPS OF ENGINEERS
WALTHAM, MASS.
BRIDGEPORT HARBOR
CONNECTICUT
CONDITION SURVEY
35 FT. MAIN SHIP CHANNEL
35 FT. TURNING BASIN
18 & 25 FT. ANCHORAGES
DATE JULY 1978
SCALE As Shown
SPEC. NO. DACW 33
DRAWING NUMBER
Bt. 497
SHEET 3 of 3

FIGURE 6

(2) simultaneous modification of assessment methods that parallel laboratory and field studies;

(3) a field disposal site testing and evaluation program to validate both the methods and program rationale;

(4) and, further long-term planning and strategy evaluation will be mutually developed by EPA/CE mmnagers and scientists.

Dredging in the channel will be accomplished by both hydraulic and clamshell dredges. The hydraulic dredge will pump approximately 10,000 to 15,000 cubic yards of dredged material into a 1-1/4 acre tidal flat/cove area. Weather permitting this dredging will start in early winter. If postponed it will be accomplished very early in the spring of 1983. To contain the dredged material, a steel sheet bulkhead will be constructed across the mouth of the cove. An adjustable weir will be installed in the bulkhead to permit placement of the dredged material to varying elevations to provide both upland and wetland habitat. See Section V for a discussion of the upland/wetland research portion of the FVP. A 72-inch storm water line presently empties into the head of the cove. That line will be extended through the area to facilitate discharges channelward of the bulkhead. Construction of the bulkhead and extension of the storm line is scheduled to begin in September 1982. The material placed in the cove area will come from various locations along a stretch of the channel (Section 2) extending from the upper portion of Black Rock Harbor to a point just downstream of the confluence of the east and west branches of Cedar Creek. From this same portion of the channel, a clamshell dredge will remove approximately 70,000 cubic yards of sediment to provide the 17 foot depth and 150 foot width. This dredging will start early in the spring of 1983. The material will be placed in scows and point dumped at a selected location in the northeastern portion of the Central Long Island Sound Disposal Area. The resultant pile will not be capped or covered by other dredged sediment and it will be the focal point of the aquatic disposal studies of the FVP. The remaining areas in the channel will also be dredged by a clamshell dredge in the spring of 1983 and this material (<125,000 cy) will be point dumped at a different location within the Central LIS site. The deposit created by this disposal action will be capped by material dredged from another Federal navigation project, either outer New Haven Harbor or the mouth of the Connecticut River. Disposal and capping of this pile may be the subject of a capping study which could be incorporated into the FVP. Ongoing analysis of the Black Rock Harbor/Cedar Creek sediments will determine whether or not the capping study is feasible. If not, this deposit will be included as part of our customary monitoring of the site under the DAMOS Program.

In conjunction with the Corps of Engineers maintenance dredging project, O&G Industries, Inc. has requested a Corps of Engineers permit under Section 10 of the River and Harbor Act of 1899 (33 U.S.C. Sect. 403) and Section 404 of the Clean Water Act (33 U.S.C. Sect. 1344) and has requested a Water Quality Certification from the CT Department of Environmental Protection under Section 401 of the Clean Water Act to:

a) retain approximately 7,800 cubic yards of sand and gravel fill placed seaward of the mean high water line since the early 1970's without the required Corps permits. The fill was placed intermittently since the early 1970's and is part of an ongoing sand and gravel operation on this property and will continue to be used for stockpiling sand and gravel. The existing slope will form the southwesterly boundary of the Corps' dredged material disposal area;

b) maintenance dredge, in conjunction with the Corps of Engineers maintenance dredging project, approximately 30,000 cubic yards of material to create a channel 18 feet deep for access to O & G's shoreline property. The material will be dredged with a mechanical bucket dredge and will be disposed of in an approved disposal site in Long Island Sound in conjunction with the Corps of Engineers maintenance dredging project. The material is class III (Interim Plan Standards); and

c) construct a 376 foot steel sheet bulkhead approximately 20 feet seaward of the existing shoreline along the U.S. Pier and Bulkhead Line. The area between the proposed bulkhead and the existing shoreline is proposed to be filled with approximately 5,200 cubic yards of sand and gravel fill which will be placed seaward of the existing mean high water line. The area proposed to be filled is now occupied by a deteriorating pile-supported pier. The filled area will be used as a waterfront loading and storage area.

II. PURPOSE AND NEED FOR THE PROJECT

In formulating the proposed plan, a review was made of current project use to determine needed dimensions. There are two active terminals located at the upper end of the project; Crowley Terminal on the west branch and Inland Fuel Terminal on the east branch. Crowley Terminal services Consumer Petroleum and D'Addario Industries as well as 40 other retail fuel oil dealers including Kaufman, Mercury, Mitchell, Sadowy, Standard, Montonari, Devino, Branchville and Mercurio. Inland Fuel Terminal services not only Santa Fuel but 51 fuel oil dealers in Metropolitan Bridgeport and Danbury. In addition, Inland Terminal thru-puts #2 oil for 15 companies. In all, over 100 companies are dependent on maintenance of the channel.

During 1980, our waterborne commerce records indicate that petroleum products were delivered to the two terminals by fifteen different barge and tub combinations and four small, self-propelled tankers. According to 1978 published statistics and later statistics which have not been formally compiled, these type vessels make approximately 100 trips and deliver approximately 200,000 tons per year. The tankers range in length from 263 to 290 feet and in draft from 12 to 14.1 feet. The breadth of these vessels is approximately 40 feet. The barges range in length from 215 to 323 feet, in draft from 11.3 to 15 feet, and in breadth from 40 to 52 feet. The barges are maneuvered up to the terminals alongside tugs which have breadths of approximately 30 feet and draw between 12 and 13 feet. This arrangement creates a combined width of 37 to 90 feet. A check with Poling Transportation, which makes a majority of the deliveries, indicates that the minimum channel width which they recommend would be 150 feet. Based on these statistics, prospective use by deeper draft barges and the necessity to minimize the maintenance frequency, we have selected a channel 150 feet wide dredged to a depth of 17 feet plus 1 foot of overdepth.

III. ALTERNATIVES TO THE PROPOSED ACTION

A. No Action

The no dredging alternative is undesirable from both an economic and environmental standpoint. Discontinuance of maintenance dredging would result in channel depths being further reduced. Shoaling in Black Rock Harbor has reduced channel depths to approximately 13 feet with isolated shoaling to 9 feet (Figures 2-5). The limited depth and delay costs of $200.00 to $300.00 per hour have forced users to reduce the draft of using vessels which result in less economical loads. These costs are invariably passed on to the consumer. Shoaling increases the potential for grounding and reduces the time available for deeper draft traffic to move in and out of the harbor. These conditions could contribute to groundings and the release of dangerous materials. Consequently, the no dredging alternative is not a feasible alternative to meet the needs of the region.

B. Other

There are no other alternatives available to the proposed action of maintenance dredging which will meet the needs of the waterborne commerce within the project area. There are several potential alternatives available for review in regards to disposal of the dredged material.

During the planning stages of this project, both upland and tidal sites were investigated for possible use as disposal areas. The City of Bridgeport participated in the investigations and the sites are shown on Figure 7. The suitability of a site takes into consideration such factors as: location, availability, acreage, elevation, configuration, diking or bulkheading requirements and future use.

Site A is a city owned upland area comprising approximately ten acres and is bordered by Black Rock Harbor and Cedar Creek, the municipal landfill area and a parking lot for Seaside Beach Park. The area is filled land which has been created during the past ten years and has questionable foundation characteristics. Although sufficient in acreage, elevation, and location to be considered for disposal area use, the long narrow configuration of the area makes it unsuitable for properly retaining dredged sediment. The cross section of dike needed to contain a substantial amount of material at this site would further restrict the width of the area. The narrowness would make it impossible to create an adequate settling basin without resorting to intermittent pumping by the dredge and corresponding poor dredge performance. In addition, in a letter dated 2 November 1981, the city indicated that this area could not be made available for disposal.

Site B is a city owned upland area comprising approximately seven acres and is bordered by the landfill site, a city street and a storage area utilized by Sikorsky Aircraft Corp. This is a feasible site based on location, elevation, and configuration. The site would have to be used in conjunction with several other areas to make upland disposal a viable option. According to City officials, this area could not be made available for disposal as it is being reserved for expansion of the city landfill.

Site C is an upland site comprising about four acres. Elevations within the site may vary from about 10 to 40 feet above mean low water (mlw) which makes approximately one-half of the area unsuitable for disposal because of the high elevation. The area is simply too small and the diking required is too extensive to make the site feasible. In addition, use of the site is likely to be opposed to by residents of an elderly housing complex and a city housing project which border the site.

Sites D and E are subtidal areas fringed by marsh vegetation. If abutting private landowners were in favor of filling these areas, the only environmentally sound method of filling would be to create marshland. Considering the limited acreage of these two sites (less than 4 acres) and the limiting elevation factor of approximately 5 feet above mlw, the capacity would be on the order of only 25,000 cubic yards. In addition, bulkheading or diking to enclose these areas would be prohibitively expensive compared to the minimal benefit of limited disposal capacity and small marshlands that could be created.

Site F was originally rejected for reasons similar to sites D & E. The site is now proposed for use because it fits into the research effort outlined in Section I, Project Description.

With the lack of upland or tidal areas, the only viable alternative for disposing of the remainder of the dredged sediments is open water disposal in Long Island Sound. Disposal in the western portion of the sound would be preferable from an economic standpoint but the Central Long Island Sound Disposal Area was selected because of the baseline data that has been developed for this area over the past 10 years. In particular, the intense monitoring of the Stamford/New Haven and Norwalk projects have provided the information needed to accurately predict and implement the type of disposal operation required to support the FVP. Monitoring techniques that have been undertaken at this site and which will be employed for this project will include but not be limited to: detailed bathymetry; side scan sonar surveys; visual observation via SCUBA and underwater photography and/or TV; suspended sediment observation equipment; bottom sediment sampling and biological sampling. Section V contains a discussion of the FVP and associated monitoring.

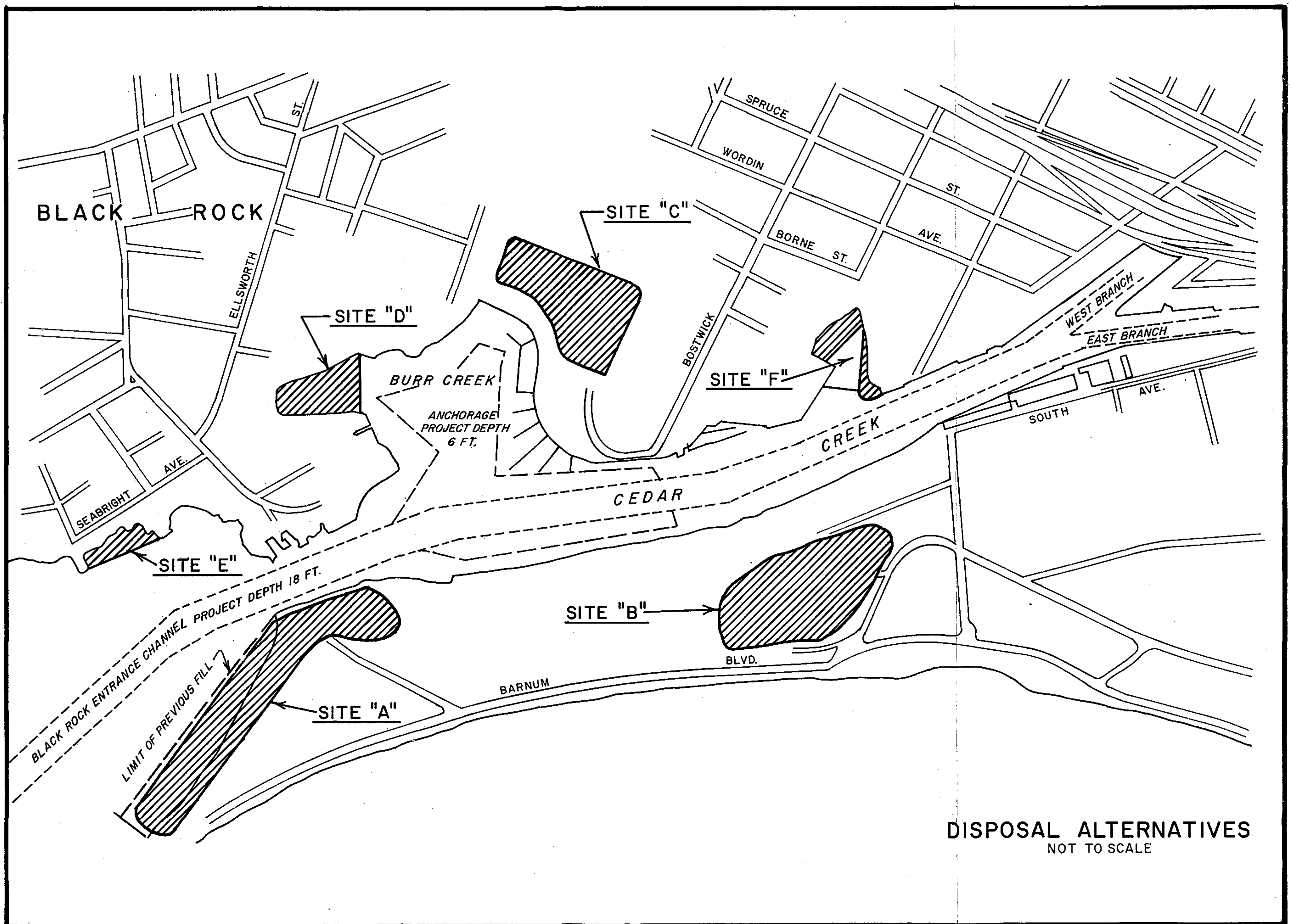

BLACK ROCK
ST.
ELLSWORTH
SITE "D"
SITE "C"
SPRUCE
WORDIN
ST.
BORNE ST.
AVE.
BOSTWICK
SITE "F"
WEST BRANCH
EAST BRANCH
BURR CREEK
ANCHORAGE PROJECT DEPTH 6 FT.
CREEK
CEDAR
SOUTH
AVE.
AVE.
SEABRIGHT
SITE "E"
BLACK ROCK ENTRANCE CHANNEL PROJECT DEPTH 18 FT.
LIMIT OF PREVIOUS FILL
SITE "A"
SITE "B"
BLVD.
BARNUM
DISPOSAL ALTERNATIVES
NOT TO SCALE

FIGURE 7

IV. ENVIRONMENTAL SETTING

This description of the Black Rock and Bridgeport Harbor areas is partially based on a Draft Environmental Report for maintenance dredging at Bridgeport Harbor prepared for the Corps of Engineers by TRC Consulting, Inc. (TRC, 1977).

A. General

Black Rock and Bridgeport Harbors are located in the city of Bridgeport in Fairfield County, Connecticut. The city is situated along the north shore of Long Island Sound about 57 miles east of New York City and 20 miles west of New Haven, Connecticut. Black Rock Harbor is primarily a recreational port which is surrounded by residential areas, industries, marinas, a park and a land fill. Bridgeport Harbor is the second largest commercial port in Connecticut and is situated in a highly developed urban/industrial setting.

B. Hydrology

Both Black Rock and Bridgeport Harbors have well mixed estuarine waters with salinities generally not exceeding 28 parts per thousand during flood tide. The Pequonuock River is a freshwater source to Bridgeport Harbor. It has a mean annual flow of 12.4 cubic feet per second (cfs) and does not contribute to a significant stratification in the harbor.

Tidal currents at the harbor entrances average 0.7 knot at flood tide and 0.6 knot at slack tide. The mean tidal range is about 6.7 feet.

C. Water Quality

The waters of Black Rock and Bridgeport Harbor are currently classified "SC" by the State of Connecticut. This classification indicates a limited suitability for certain fish and wildlife, recreational, boating, certain industrial processes and cooling, and good aesthetic value. This classification is not suitable for bathing, and therefore is considered unacceptable. The water quality goal is "SB" which would be suitable for bathing and offers excellent fish and wildlife habitat.

The main reason for the classification is the combined sewage overflows involving two secondary sewage treatment plants in the area. One plant is located in Bridgeport Harbor and the other is in Black Rock Harbor. Although both plants generally discharge within the secondary standards, the released nutrients, solids and coliform bacteria contribute to the long term degradation of both harbors.

Another major factor is the industrial discharges which occur in the area. Harbor owned industries under permit are allowed to discharge effluents with limited deviations in temperature, pH, dissolved solids, metals and oil and grease. The discharge of dissolved metals by some industries has been recently curtailed by the State of Connecticut (Water Compliance Unit, CT DEP, personal communication).

Currently, little water quality data on Black Rock or Bridgeport Harbors exists. Table 1 summarizes water quality data from a 1975 study (Verses et al., 1975, cited by TRC, 1977). These results indicate that the Bridgeport Inner Harbor area is severely degraded. Unusually high total and fecal coliform counts as well as high concentrations of nitrates, ammonia and phosphates were observed (Verses et al., 1975). Dissolved metal and polychlorinated biphenyl (PCB) concentrations from 1980 Corps of Engineers data are shown in Table 2.

D. Sediments

The sediments in the harbor areas are derived from several sources. The coarser material has been generally deposited as glacial till during the recession of the last glacier. The fine sediments which over-lay much of the glacial deposits are derived from the deposition of suspended fines from Long Island Sound, suspended solids from sewage treatment plant and industrial effluents and suspended loads from the Pequonneck River (in the case of Bridgeport Harbor). Sediments in each harbor are described below.

1. Black Rock Harbor: Recent benthic surveys of Black Rock Harbor conducted under contract by the Corps of Engineers, New England Division (CE, NED) indicate that Black Rock Harbor is primarily organic mud with coarser material (sand and silty sand) in the eastern portion of the outer harbor just upstream of Fayerweather Island and downstream of Buoy N "8". (CEM, 1982).

Sediment analyses of the harbor channel were accomplished in the years 1973, 1975, and 1979 by the CE, NED. Figures 2-5 indicate the sample locations. Data for the sediment samples are tabulated in Tables 3, 4 and 5 for three sections of the Federal channel. The channel surface sediments are primarily composed of organic or sandy silt with a petroleum odor in the upper reaches of Cedar Creek and a typical salty marine odor in the lower reaches.

Sediment contaminant levels are also presented in Tables 3, 4, and 5. The levels may be compared with the sediment classification system in the Connecticut-New York Interim Plan (NERBC, 1980) which is shown in Table 6. Table 6 indicates the relative contaminant levels as low, moderate or high, according to the classification scheme. In general, volatile solids, oil and grease, and metal levels are considered "high" at almost every sample site from the upper reaches of Cedar Creek in Section "1" through Section "2" and halfway downstream in Section "3" (just upstream of Buoy N "8"). The sediments below this area downstream to the channel entrance are significantly "cleaner" with only a few metals in the high category.

TABLE 1*

Water Quality Parameters in Black Rock and Bridgeport Harbors

Parameters (mg/l)	Black Rock Harbor	Bridgeport Harbor: Outer Harbor (Surface)	Bridgeport Harbor: Outer Harbor (5 ft from Bottom)	Bridgeport Harbor: Inner Harbor (Surface)	Bridgeport Harbor: Inner Harbor (5 ft from Bottom)	Pequonnock River (One Run) High Tide
Temperature C°	22.1	22.3	19.1	23.6	19.3	26.0
pH	7.55	7.73	7.62	7.74	7.68	7.80
Nitrates	1.123	0.765	0.539	0.812	0.529	2.485
Free Ammonia	1.214	0.240	0.248	0.411	0.245	0.329
Dissolved Oxygen	6.225	7.141	5.790	6.360	5.464	7.310
Biochemical Oxygen Demand (BOD)	6.364	1.226	0.944	1.565	0.872	2.040
Poly Phosphate	0.132	0.055	0.033	0.069	0.038	0.040
Ortho Phosphate	0.239	0.048	0.045	0.109	0.055	0.050
Total Phosphate	0.377	0.099	0.075	0.187	0.095	0.090
Fecal Coliform	1,878	418	136	2,131	247	270
Total Coliform	5,813	5,530	396	27,375	385	All Atypical Coliforms
Fecal Coliform / Total Coliform	0.240	0.103	0.085	0.145	0.145	None

*Modified from Verses *et al*. (1975) cited in TRC (1977).

TABLE 2

Metal and Organic Concentrations[1]
in Black Rock and Bridgeport Harbor Waters[2]

Constituent	Black Rock Harbor[3]	Bridgeport Harbor[4] Inner	Bridgeport Harbor[4] Outer
Oil and Grease	<1.0	3	1.3
Mercury	0.004	0.025	0.036
Lead	<0.005	<0.005	<0.005
Zinc	0.047	<0.005	<0.005
Arsenic	<0.002	<0.002	<0.002
Cadmium	<0.006	<0.005	<0.005
Chromium	<0.010	<0.01	<0.01
Copper	<0.0086	0.006	<0.005
Nickel	0.04	0.016	0.030
Vanadium	<0.025	0.025	<0.025
PCB's (ppb)	11(2)	18(1)	4.4(2)

(1) All concentrations are in parts per million (ppm) except where noted.
(2) Data from CE (1980).
(3) Average of 7 samples unless noted otherwise in parentheses.
(4) Average of 3 samples unless noted otherwise in parentheses.

TABLE 3

Sediment Analyses of Sample Sites in Section "1" of Black Rock Harbor, Bridgeport, Connecticut

Station	GE-6-76	PE-6-79		PE-7-79	KE-14-73	
Soil Description	Black, gravelly, sandy silt (wood, cobbles, petroleum)	Medium to fine sandy organic silt (Pet. Odor)		Medium to fine sandy organic silt	Black, fine, sandy	
Median grain size	mud	0.038		0.18	0.042	
% fines	-	65.0		33.5	67.8	
sample depth (ft)	surface	0.0-0.25	1.0-1.17	0.0-0.25	0.0-0.25	1.0-1.17
% Vol. Solids EPA	7.55	16.9	--	18.3	22.18	--
% Vol. Solids NED	5.91	15.2	--	16.6	15.0	--
Chemical Oxygen Demand (ppm)	146,000	320,000	--	320,000	370,000	--
Total Kjeldahl Nitrogen (ppm)	1,690	6,700	--	5,700	9,200	--
Oil and Grease (ppm)	1,800	27,800	--	38,900	3,300	--
Mercury (ppm)	0.49	2.1	4.3	1.0	4.3	1.5
Lead (ppm)	481	920	700	1,200	881	550
Zinc (ppm)	886	3,180	2,860	2,690	1,920	2,986
Arsenic (ppm)	7.9	2.2	1.8	2.2	19.0	7.8
Cadmium (ppm)	9.2	25	83	13	61	141
Chromium (ppm)	404	1,440	1,600	648	2,400	3,162
Copper (ppm)	674	1,440	4,200	1,600	2,268	2,287
Nickel (ppm)	96	270	160	560	280	415
Vanadium (ppm)	77	60	60	50	160	249
PCB (ppb)	--	--	--	--	2,010	--
DDT (ppb)	--	--	--	--	1,160	--

-- Not Analyzed

TABLE 4

Sediment Analyses of Sample Sites in Section "2" of Black Rock Harobr, Bridgeport, Connecticut

Station	PE-5-76		PE-2-79		PE-21-73	PE-4-76		PE-1-79		PE-5-79	
Soil Description	Black Fine sandy organic silt/ marine		Organic silt Pet. Odor		Black organic silt w/ shell	Black organic silt/marine odor		Medium to fine organic silt w/ marine odor		Fine sandy organic silt w/marine odor	
Median grain size (mm)	0.014		0.014		0.0039	0.0090		0.0175		0.0330	
% fines	64.6		89.5		98.3	96.8		69.5		66.5	
Sample Depth (ft)	0.0-0.17	0.83-1.0	0.0-0.25	1.0-1.17	1.0-1.17	0.0-0.17	1.0-1.17	0.0-0.25	1.0-1.17	0.0-0.25	1.0-1.17
% Vol. Solids EPA	10.66	2.80	15.2	--	--	15.54	13.90	15.5	--	8.5	--
% Vol. Solids NED	9.69	--	18.5	--	--	14.38	--	13.4	--	5.9	--
Chemical Oxygen Demand (ppm)	210,000	--	310,000	--	--	255,000	--	290,000	--	85,000	--
Total Kjeldahl Nitrogen (ppm)	4,270	--	6,700	--	--	7,160	--	5,700	--	2,100	--
Oil and Grease (ppm)	1,800	--	30,700	--	--	1,900	--	26,600	--	4,830	--
Mercury (ppm)	1.81	0.58	4.4	2.4	1.7	1.67	2.39	5.5	5.1	2.8	1.6
Lead (ppm)	427	108	570	500	505	586	573	450	460	90	250
Zinc (ppm)	488	279	3,360	3,280	1,460	1,507	1,145	3,040	2,920	409	867
Arsenic (ppm)	11.0	7.4	1.6	2.4	39.0	14.0	13.0	1.8	2.7	0.9	2.5
Cadmium (ppm)	37.0	9.9	32	49	16.0	22.0	24.0	37	48	6.0	7.0
Chromium (ppm)	671	263	3,040	2,510	1,772	2,260	1,503	3,040	125	136	1,190
Copper (ppm)	792	542	7,050	6,850	1,860	2,344	2,791	6,330	8,270	166	1,270
Nickel (ppm)	152	46	290	170	266	242	193	230	170	60	120
Vanadium (ppm)	122	46	130	140	213	167	143	60	80	30	60
PCB (ppb)	--	--	--	--	--	--	--	--	--	--	108
DDT (ppb)	--	--	--	--	--	--	--	--	--	--	1.5

-- Not Analyzed

TABLE 5

Sediment Analysis of Sample Sites in Section "3" of Black Rock Harbor, Bridgeport, Connecticut

Station	PE-20-73		PE-3-76		PE-4-79		PE-19-73		PE-2-76		PE-3-79		PE-18-73		PE-1-76	
Soil Desc.	Black organic silt		Black organic silt w/marine odor		Fine sandy organic silt w/ marine odor		Black organic silt w/shell fragments		Black fine sandy organic silt w/marine odor		Fine sandy organic silt w/marine odor		Black fine sandy silt w/shell frag.		Black fine sandy organic silt w/ marine odor	
Median grain size (mm)	0.013		0.0088		0.0115		0.012		0.015		0.0660		.042		0.0280	
% fines	97.4		96.6		88.0		96.3		81.2		54.0		76.3		78.7	
Sample depth (ft)	0.0-0.17	0.53-0.70	0.0-0.17	1.0-1.17	0.0-0.25	1.0-1.17	0.0-0.25	1.0-1.17	0.0-0.17	1.0-1.17	0.0-0.25	1.0-1.17	0.0-0.25	1.0-1.17	0.0-0.25	1.0-1.17
% Vol. Solids EPA	13.31	--	11.35	8.64	11.3	--	12.13	--	8.01	7.93	5.1	--	8.66	--	6.10	5.55
% Vol. Solids NED	11.66	--	10.18	--	8.3	--	9.85	--	7.46	--	2.8	--	6.65	--	4.67	--
Chemical Oxygen Demand (ppm)	173,000	--	166,000	--	140,000	--	149,000	--	108,000	--	63,000	--	123,000	--	714,000	--
Total Kjeldahl Nitrogen (ppm)	8,000	--	4,900	--	4,800	--	6,270	--	3,330	--	1,700	--	5,190	--	1,930	--
Oil and Grease (ppm)	7,680	--	8,670	--	2,190	--	6,320	--	4,490	--	1,450	--	4,060	--	2,460	--
Mercury (ppm)	0.91	1.3	1.23	1.48	1.3	2.2	0.97	1.0	0.8	0.95	0.6	1.5	0.39	1.8	0.46	0.79
Lead (ppm)	230	225	314	246	170	190	136	203	198	190	30	70	84.0	90.0	127	114
Zinc (ppm)	1,067	504	659	688	677	849	712	1,293	390	476	154	317	319	308	267	227
Arsenic (ppm)	11.0	6.1	9.7	11.0	1.6	2.0	18.0	1.1	7.1	7.9	1.4	1.9	4.2	7.0	5.1	5.3
Cadmium (ppm)	12.0	6.8	11.0	13.0	12.0	8.0	6.8	9.4	3.4	5.7	3.0	3.0	3.4	3.6	4.2	2.7
Chromium (ppm)	2,134	640	911	933	385	801	729	1,020	305	524	48	166	268	235	242	227
Copper (ppm)	2,049	654	1,004	1,179	246	990	805	1,192	543	881	14	126	310	398	369	583
Nickel (ppm)	231	116	138	93	100	95	127	122	79	66	45	50	134	50	59	38
Vanadium (ppm)	171	109	126	98	50	50	136	158	85	95	60	30	85	92	64	58
PCB (ppb)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	900	--
DDT (ppb)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.007	--

-- Not Analyzed

TABLE 6

Sediment Classification System of the New York-Connecticut Interim Plan (NERBC, 1980)

Classification	I (low)	II (moderate)	III (high)
Parameters			
% silt-clay	<60	60-90	>90
% water	<40	40-60	>60
% Volatile Solids (NED)	<5	5-10	>10
Oil and Grease (ppm)	<2000	2000-7500	>7500
Mercury (ppm)	<0.5	0.5-1.5	>1.5
Lead (ppm)	<100	100-200	>200
Zinc (ppm)	<200	200-400	>400
Arsenic (ppm)	<10	20-20	>20
Cadmium (ppm)	<3	3-7	>7
Chromium (ppm)	<100	100-300	>300
Copper (ppm)	<200	200-400	>400
Nickel (ppm)	<50	50-100	>1000
Vanadium (ppm)	<75	75-125	>125
PCB's (ppb)	--	--	>1000
DDT (ppb)	--	--	>500

2. Bridgeport Harbor: Benthic studies conducted in Bridgeport Harbor have indicated that harbor sediments are primarily fine grained in the inner harbor and coarser grained in the outer harbor (CEM, 1982).

Analyses of the anchorage area sediments were done by the Corps of Engineers NED in 1973 (Site KE-15-73, Table 7). Sediments are primarily organic silt with some sand in the area. Chemical analyses of that site indicate that all metal levels are considered high when compared with Interim Plan Criteria (Table 6). In as much as analyses of one sediment sample should not be considered as representative of the area to be dredged, thus analyses of two adjacent locations, PE-6-75 and PE-4-79, were included as supplemental data. Both sites were less contaminated than KE-15-73.

E. Benthos

The benthic communities of Black Rock and Bridgeport Harbors have been studied in 1981 under contract by Center for the Environment and Man (CEM, 1982). The following descriptions were based on their analyses.

1. Black Rock Harbor: Section "1" of the harbor (Figure 1) was generally devoid of benthic organisms. The authors concluded this was due to the petroleum contamination of the sediments in this area.

Information on Section "2" of the harbor channel indicated that the benthic environment was under chronic and occasionally acute stress due to sediment contamination and seasonal hypoxia. As a result, the community was low in species diversity and density and dominated by the opportunistic polychaete *Capitella capitata*.

The upper half of the channel in Section "3" was also described as a stress situation. The pollution levels and seasonally low dissolved oxygen levels in Section "2" in the inner harbor have affected the upper reaches of the outer harbor. The communities in this portion were not significantly different in species diversity from those in Section "2". *Capitella* was the dominant species.

Adjacent to the upper half of the Section "3" channel is a sandy habitat just upstream of Fayerweather Island. The sediments in this area are comprised of shell, sand and mud and are more oxygenated than the previous described areas. The benthic community is the most dense and diverse in the entire harbor. Many molluscs and crustacea were well represented but were dominated by "pollution-tolerant" species such as the polychaetes *Streblospio benedicti*, *Polydora ligni*, and *Nereis succinea*. These latter species indicate a low level stress condition but a healthier situation than the previously described areas. Comparison of spring and summer samples indicates that these areas may not have depressed dissolved oxygen levels during summer.

TABLE 7

Sediment Analyses of Sample Sites in Anchorage Area and Vicinity of Bridgeport Harbor, Bridgeport, CT

Station	Anchorage Area KE-15-73		Anchorage Area Vicinity PE-6-75		PE-4-79
Soil Description	Black organic silt		Dark gray Organic silty medium fine sand		Fine sandy organic clay
Median grain size (mm)	0.011 93.2		0.14 35		0.13 90
Sample depth (ft)	0.0-0.17	0.63-0.80	0.0-0.17	0.58-0.75	0.0-1.9
% Vol. Solids EPA	11.34	--	4.06	1.66	8.9
% Vol. Solids NED	7.67	--	2.71	--	6.2
Chemical Oxygen Demand (ppm)	134,000	--	58,700	--	100,000
Total Kjeldahl Nitrogen (ppm)	7,090	--	1,260	--	3,600
Oil and Grease (ppm)	7,180	--	2,370	--	3,500
Mercury (ppm)	0.82	0.65	0.59	0.36	3.6
Lead (ppm)	265	108	88	40	130
Zinc (ppm)	622	432	229	153	299
Arsenic (ppm)	32	18	3.1	1.7	1.8
Cadmium (ppm)	9.2	5.4	3.8	2.3	11.0
Chromium (ppm)	494	466	184	85	137
Copper (ppm)	768	649	310	221	73
Nickel (ppm)	165	108	46	35	50
Vanadium (ppm)	128	135	38	28	50
PCB (ppb)	--	--	--	--	305
DDT (ppb)	--	--	--	--	3.4

-- Not Analyzed

The extreme lower portion of Section "3" indicates a healthy unstressed community which had a high density and diversity. The contaminant levels in the sediments are the lowest in the entire harbor. Dominant organisms included oligochaetes, the polychaetes, molluscs and crustacea.

2. Bridgeport Harbor: The numbers of species and the general pattern of species diversity and abundance in Bridgeport Harbor were roughly similar to that seen in Black Rock Harbor. As with Black Rock Harbor, the species diversity and density of the benthic fauna in the inner harbor and the upper portion of the outer harbor were generally low indicating a stressed and polluted environment. The diversity and density greatly increased in the lower portion of the outer harbor just inside the breakwaters, but still indicated a low level stress situation. The approach channel outside the outer harbor consisted of diverse unstressed mud and sand associated communities.

The anchorage area was found to support a low species diversity and density community. Dominant species during the summer months included the polychaetes Mediomastus ambiseta and Streblospio benedicti which were indicative of the stressed environment.

F. Shellfisheries

The Black Rock and Bridgeport Harbor area provides habitat for an extensive commercial oyster shellfishery. Various designated seed areas are leased or franchised from the State of Connecticut or the city of Bridgeport. The entire harbor area is closed to harvesting for direct market and consumption. Thus, shellfish must be transferred to certified grounds that meet the Food and Drug Administration water quality criteria (coliform bacteria counts must be less than 70 MPN per 100 ml). The oysters must undergo depuration of the bacteria and other contaminants before they can be marketed.

Figure 8 indicates the location of the various shellfish grounds in both Black Rock and Bridgeport Harbors. The beds inside the jurisdiction are managed by the State Health Department through the city of Bridgeport and those outside the line by the State Department of Agriculture. Natural beds are open to permit individual commercial fishermen whereas the "numbered" grounds are franchised or leased by various shellfishery companies. Significant natural oyster grounds in Black Rock Harbor occur in the eastern end of the outer harbor just west of Fayerweather Island and just outside the harbor entrance. Habitat for the hard clam Mercenaria mercenaria also exists in the inner and outer harbor. The beds 801, 802, and 803 just outside Bridgeport Harbor are particularly productive seed beds. Beds within Bridgeport Harbor are less productive because of water quality problems, past dredging of suitable habitat and other development in the area. Not noted in Figure 8 is the distribution of the soft shelled clam, Mya arenaria. This species is generally found throughout Bridgeport Harbor but are most abundant in the intertidal flats west of the main channel from Tongue Point to the breakwater.

The oyster beds produce an average of 2000 bushels per acre; a market bushel consists of roughly 240 oysters which are 3-4 years old. The beds just outside of the Bridgeport Harbor entrance are particularly productive with yields in excess of 5000 bushels per acre.

G. Finfish

Approximately 100 species of finfish have been found in Long Island Sound and its estuaries (Thomas *et al.*, 1971). These species include wholly marine residents, regular seasonal visitors, occasional visitors, and estuarine forms. Estuarine areas such aa Bridgeport and Black Rock Harbors experience seasonal influxes of juvenile marine species such as menhaden (*Brevooria tyrannus*) and bluefish (*Pomatomus saltatrix*) that utilize these waters as nursery areas. Menhaden appear in the estuaries during April while juvenile bluefish move inshore during late summer. Resident marine species that exhibit seasonal on shore-off shore movements may be found in the Harbor areas. Scup (*Stenotomus chrysops*) move inshore during the early summer, tautog (*Tautoga onitis*), are seen inshore April to November but move into deeper water during cold weather. Summer flounder (*Paralichthys dentatus*) and black seabass (*Centropristes striatus*) also move inshore during the summer. Regular seasonal visitors to the sound that may occur in the harbor areas include weakfish (*Cynoscoin regalis*, late spring to fall), bluefish (May or June to the fall) and adult menhaden (April to November or December). Striped bass (*Morone saxatilis*) migrate north in the early spring and usually appear in the Sound following the schools of menhaden. Evidence indicates that a small population of striped bass overwinters in the Sound.

Limited fisheries information for Bridgeport Harbor exists. As part of an ecological study of Bridgeport Harbor for United Illuminating Company (UI) a creel census along with gill net and seine collections were made during July 1972 (Normandeau Assoc., 1973). Table 8 lists the species collected and relatively abundance. Bluefish were reported to be very active in the UI unit #3 discharge. Successful fishermen had a catch per unit effort of 13.98 fish/hour. The most abundant species collected was the Atlantic silversides. This species was found in extremely high numbers in the UI #3 discharge. Striped bass were also collected in the UI unit #3 discharge.

The State of Connecticut conducted trawl collections in Bridgeport Harbor during 1974 and 1975 as part of a statewide monitoring program (Cortell Associates, 1976). Alewife (*Alosa pseudoharengus*), bluefish, and weakfish were collected in extremely low numbers.

Although anadromous species such as alewife and American shad (*Alosa sapidissimia*) are not known to utilize the harbor areas for spawning or migration to spawning areas, these species have been observed in the area. American shad were observed stranded by the tide in a creek in Lordship Marsh which is adjacent to Bridgeport Harbor.

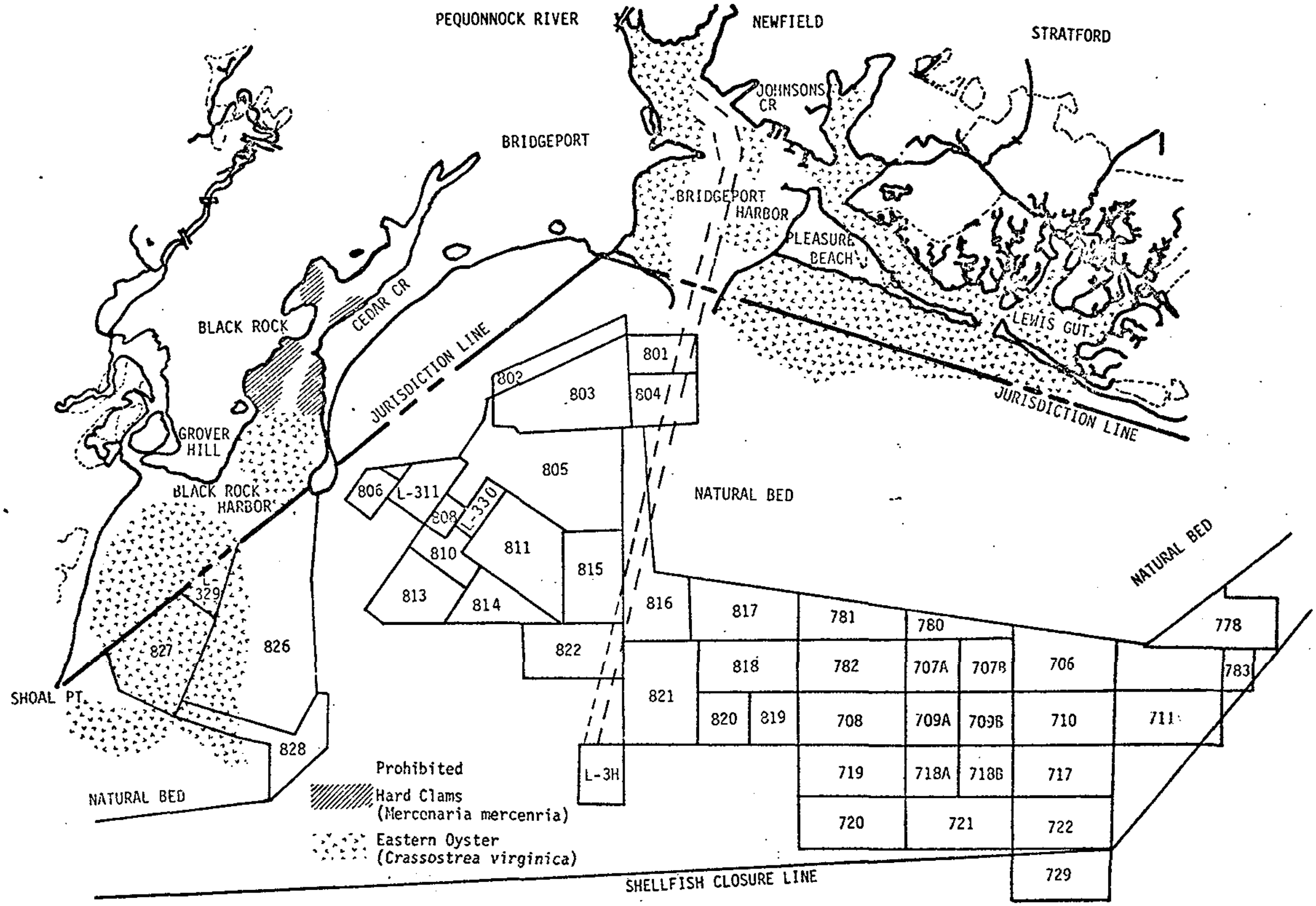


Figure 8: Shellfish beds - Bridgeport, Connecticut (TRC, 1977)

TABLE 8

Species List and Relative Abundance of Fish Collected During the July 1972 Bridgeport Harbor Fishery Survey (Normandeau Assoc. 1973)

SCIENTIFIC NAME	COMMON NAME	OCCURRENCE
Morone saxatilis	Striped bass	Infrequent
Pomatomus saltatrix	Bluefish	Common
Menidia menidia	Atlantic silversides	Abundant
Liopsetta putnami	Smooth flounder	Common
Brevoortia tyrannus	Menhaden	Infrequent
Cynoscion regalis	Weakfish	Infrequent
Stenotomus chrysops	Scup	Infrequent
Prionotus carolinus	Sea robin	Common
Fundulus majalis	Striped killifish	Abundant
Syngnathus fuscus	Atlantic pipefish	Common
Morone americanus	White perch	Common

H. Wildlife

The small amount of open space in the highly developed urban setting of both harbor areas offers only a limited habitat for wildlife species in the area. The most significant habitat nearby is the Stratford Great Meadows saltmarsh and Long Beach area, which is east of Bridgeport Harbor. It provides wintering feeding, resting and nesting habitat for transient or resident birds, mammals, reptiles and amphibians in the region. The various sand and mud flats in both harbors have feeding and resting areas for shorebirds, wading birds, waterfowl and small mammals. However, use of these areas compared with the Great Meadow marsh is limited.

I. Endangered Species

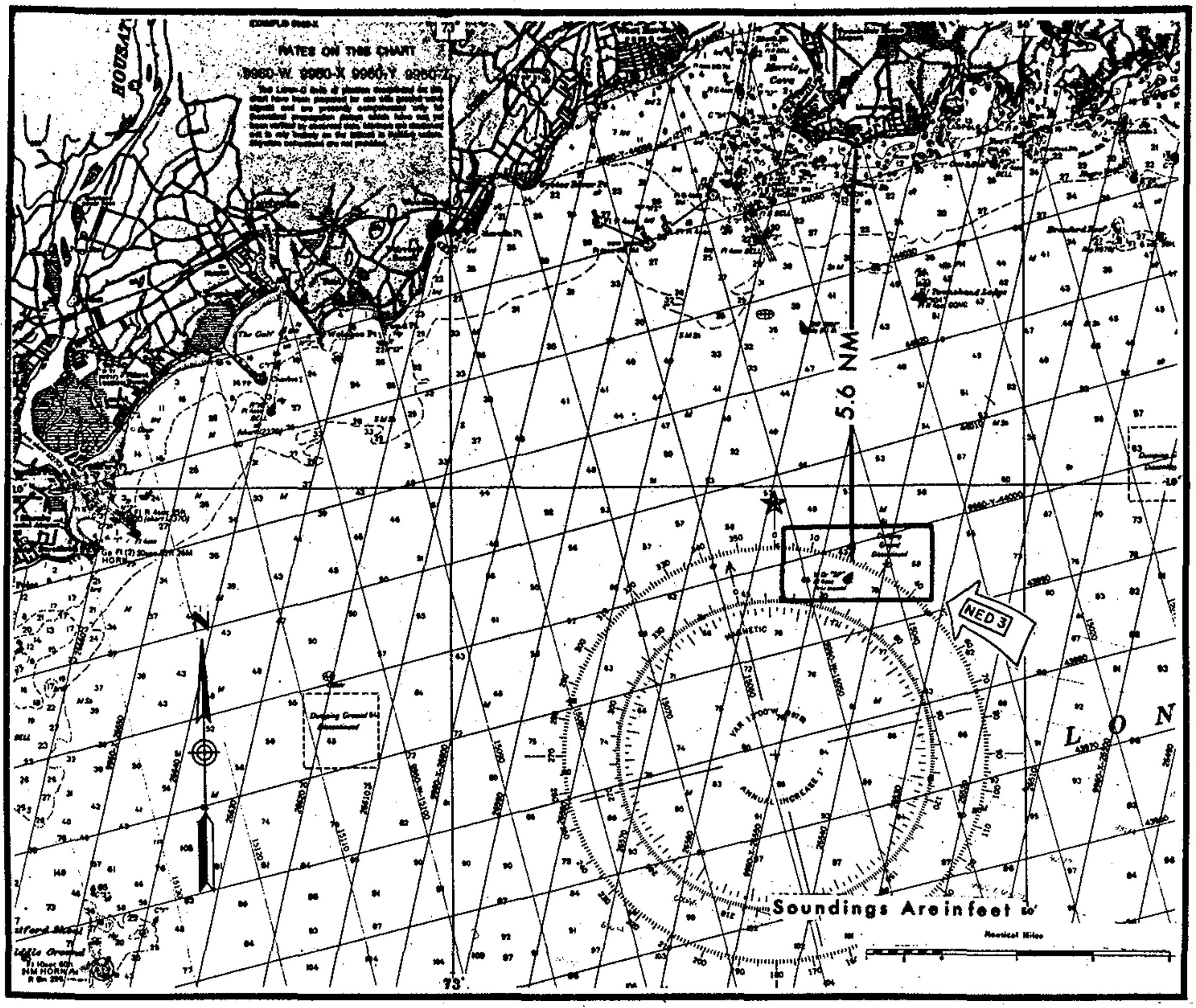
Currently there are no Federally listed or State designated rare, threatened or endangered species that reside in Black Rock or Bridgeport Harbors. The shortnose sturgeon (Acipenser brevirostrun) does utilize portions of Long Island Sound but is mainly found in the Connecticut River area where significant spawning habitat occurs. The bald eagle and the peregrin falcon are potential transients to the area during spring and fall migration. Their use of the harbor area would be a rare event.

J. Proposed Disposal Areas

1. Black Rock Harbor mud flat: The proposed intertidal disposal area is located in a small cove along Cedar Creek in upper Black Rock Harbor (Figures 1, 2). It consists of a 1.25 acre intertidal mud flat area bordered by a resource recovery plant on the east side and a filled-in parking area on the west side. A storm water outlet that drains onto the flat from the northern end of the cove. Mean daily tidal fluctuations are about 7 feet which exposed almost the entire flat during low tide.

There is little or no macrophytic vegetation on the flat area. Primary productivity is derived from benthic algae and bacteria. An assortment of mud-associated intertidal benthic invertebrates such as polychaetes, crustacea, and bivalves inhabit the area. These serve as forage for a limited number of shorebirds and wading birds which use the area during low tide.

2. Central Long Island Sound Disposal Site: Approximately 195,000-200,000 c.y. of dredged material would be disposed at the Central Long Island Sound Disposal Site near New Haven, Connecticut (Figure 9). The site has been described in Section "3" of Appendix A of the "Draft Programmatic Environmental Impact Statement for Disposal of Dredged Material in the Long Island Sound Region", released in June 1981 (CE, 1981). The site characteristics and resources are summarized in Table 9. The Central Long Island Sound is an established regional disposal site in Long Island Sound identified by the New York-Connecticut Interim Plan (NERBC, 1980) and the Final Programmatic Environmental Impact Statement (CE, 1982). Approximately 5.7 million c.y. of dredged material has been deposited there since 1955.



CENTRAL LONG ISLAND SOUND

NED 3: Central Long Island Sound N.O.S. Chart: 12354
Depth Range: 49-75 feet MLW Date: 19 April 1980
Center Coordinates: 41°-08.95'N, 72°-52.85'W
Description: This site is 2 nautical miles long by 1 nautical mile wide with the major axis running true east-west and center at 41°-08.95'N latitude and 72°-52.85'W longitude. From the center, southwest ledge light bears true 345° at 10,750 yards and Townshend Ledge Lighted Gong Buoy No. "10-A" bears true 13° at 7,400 yards. This site is approximately 5.6 nautical miles off South End Point, East Haven.

Figure 9. Location and physical characteristics of Central Long Island Sound Disposal Area

TABLE 9

Characteristics and Resources at the Central Long Island Sound Disposal Site*

Location:	41° 8.95' N 72° 52.85'W
Depth Range (ft):	49-75
Tidal currents cm/sec:	25-30 W (flood) 20-25 E (ebb)
Net drift (estuarine):	27-31 W
Water Quality:	
Stratification	strong mid-layer stratification
Suspended solids	1.0×10^4 - 20×10^4 ppb
Bottom Dissolved Oxygen %	55-65
Mercury**	0.0006 ppm
Lead**	0.017 ppm
Zinc**	0.045 ppm
Arsenic**	0.003 ppm
Cadmium**	0.006 ppm
Chromium**	0.014 ppm
Copper**	0.024 ppm
Nickel**	0.020 ppm
Vanadium**	0.010 ppm
PCB's**	0.006 ppb
DDT**	0.005 ppb
Sediment Quality:	
Sediment type	soft silt-clayey silt
% fines	80-90
% Vol. Solids	4-7.5
Oil & Grease	1,000-2,000 ppm
Hg	0.17-0.39 ppm
Pb	28-36 ppm
Zn	80-125 ppm
Cd	0.5-1.7 ppm
Cr	40-75 ppm
Cu	43-81 ppm
Ni	15-27 ppm

Benthic Organisms:	Mud associated species (polychaetes, bivalves, crustacea, etc.) moderate and high density moderate diversity
Lobster Fishery:	Falls within general distribution zone; fishery 0.6 miles to south
Finfisheries	
Commercial	Fluke, scup, flounders and menhaden taken east and west of sites
Recreational	bluefish, blackfish and sharks on shoal areas west, east and north of site

*Modified from Table III.B-1 of Appendix A, PEIS, (CE, 1981)

**Average of high water and low water samples from southern part of CLIS Disposal Site (Jan 1981).

V. PROJECT IMPACTS

A. Dredging Impacts

1. Action of Dredging

Dredging of Black Rock Harbor and the Anchorage area of Bridgeport Harbor would be accomplished by both clamshell and hydraulic dredges. The method of dredging would be dictated by the desired method of disposal. Approximately 10,000-15,000 c.y. of sediment from Section "2" of the channel is planned for disposal at the Black Rock Harbor intertidal cove area for upland/marsh creation. This would be accomplished with the hydraulic suction-cutterhead dredge. The suction-cutterhead dredge loosens the sediment with its rotating cutting edge and hydraulically pumps the resulting suspended material through a pipeline which transports the solution to the cove disposal area. The remaining volume 195,000-200,000 c.y. would be dredged with a clamshell dredge and disposed of at the Central Long Island Sound with a bottom dumping scow. The dredge excavates sediments with a jaw-shaped apparatus operated by a crane mounted on a barge. The sediments are picked up as one cohesive mass and then deposited in a scow for transport to the Central Long Island Sound Disposal site.

2. Physical Effects

Both methods of dredging would suspend and expose the dredged sediments and its constituent to the water column at the dredging site. The result is a temporary increase in turbidity and oxidation and solution of sediment contaminants.

a. Turbidity. Turbidity levels during dredging are primarily the result of the dredge disturbing the bottom sediments and through spillage in the case of the clamshell dredge. Because of the difference in sediment characteristics, ambient currents and skill differences among dredge operators, it is difficult to determine the amount of turbidity generated during dredging operations.

Studies by Bohlen *et al.* (1979) were done during the dredging of the Thames River estuarine in New London, Connecticut, partly to estimate the magnitude and characteristic of dredged-induced sediment resuspension. Approximately 1.5 to 3% of the sediment volume of each bucket load was introduced into the water column producing suspended material concentration adjacent to the dredge of 200-400 mg/l. These levels exceeded background levels by two orders of magnitude and were nearly an order of magnitude less than storm wave - induced suspensions. The magnitude of turbidity levels, therefore, would be within naturally occurring events and would last throughout the duration of the dredging. Turbidity induced by the suction-cutterhead dredge is not expected to exceed that of the clamshell dredge because the suspended sediments are removed from the site via a pipeline.

Once suspended, the sediment would settle out of the water column according to particle size. The large particles would settle very quickly whereas the finer particles may remain suspended for several days. This activity would create a turbidity plume which would be subject to movement by the tidal currents in each harbor. The suspended sediment would be deposited as a thin layer over the areas adjacent to and in the channel. The tidal currents in both harbors are relatively weak (0.6 - 0.7 knots) and should not transport the material very far from the dredge. Gordon (1974) found silt deposits of only 0.5 mm/day that were left by turbidity plume during the dredging of New Haven. No trace of silt deposition was detected 800 yards downstream of the site. It was also observed that the deposition of suspended silt within the harbor after 100,000 c.y. of material was dredged was equivalent to that deposited by winter storms.

There are shellfish which inhabit the outer harbor areas which would be subject to the increased turbidity. However, no significant impact on the population is expected because the dredging would not take place during the sensitive, reproduction and recruitment period from (1 June - 30 September). Oyster eggs and larvae are sensitive to suspended sediments concentration above 250 mg/1 (Loosanoff, 1965). However, in most years, the majority of the oyster spat have been established between the protective dates. All dredging would occur prior to 1 June 1983.

Adult oyster are generally more tolerant to turbidity. Loosanoff (1961) found the oysters lived and feed in water containing up to 700 mg/1 of suspended material with no adverse effect. Hardshell clams were even more tolerant for turbidity. In general, estuaries are subject to substantial amounts of natural and vessel induced turbidity. Consequently, the established organisms should be generally acclimated to turbidity and not significantly impacted by temporary increases caused by dredging. Finfish and mobile invertebrates such as crabs would avoid turbidity if they are irritated. Larvae and juveniles may be less able to flee affected areas.

b. Removal of Benthic Organisms. Another physical effect at the dredge site is removal of benthic organisms with excavation of the sediments. Based on the benthic studies discussed in the previous section, the channel in Black Rock Harbor and the Bridgeport Harbor Anchorage also are relatively low in density and diversity of benthic species. Thus, the loss would not be significant. Studies by McCauley *et al*. (1977) have indicated that dredged areas could begin to repopulate within 7 days after disposal ceased.

3. Chemical Effects

The harbor sediments are generally high in organic material, depleted in dissolved oxygen and have served as a sink for pollutants discharged into the harbor areas over a long period of time. Dredging activities would expose these sediments to the water column and may temporarily degrade the water quality in the proximity of the dredge.

Exposure of the anaerobic sediments and associated nutrients to the water column would temporarily decrease dissolved oxygen. The added stress to the generally anoxic bottom water of the upper harbor area could cause sporadic mortality of certain organisms in the area. Since few organisms generally inhabit these areas little impact is expected. This condition in the surface water would only be temporary since the harbor would be flushed with the next tidal cycle. The increase in nutrients could also cause minor and localized phytoplankton blooms during the spring dredging. Dredging operations would release hydrogen sulfide gas associated with the anaerobic sediments. This could temporarily cause some unpleasant odors in the harbor area.

The contaminant levels of the harbor sediments are shown in Tables 3, 4, 5 and 6. These total concentrations do not represent the actual levels which would be released into the water column or available to aquatic resources. The metals are generally bound to the sediments in various geochemical forms which have a range of potential availability. For example, substantial portions of the concentrations are tied up in the crystalline lattice of the sediments and are not biologically available. Reduceable geochemical forms such as oxides are generally more available and may release bound metals if oxidized by mixture with the dredge site water. Use of the clamshell dredge will minimize mixing of the sediments and hence minimize release of the contaminants. Studies by Windom (1973) and Windom and Stickney (1972) indicated that the metal releases from dredging are generally small in magnitude and short term.

Organisms in the harbor would probably accumulate certain contaminants as a result of the temporary release. Studies at disposal sites (Arimoto & Feng, 1980 Stout and Lewis, 1978) have indicated that the accumulation is short term. Dredging would be completed by June prior to the beginning of the sensitive period for shellfisheries.

B. Disposal Impacts

1. Upland/Marsh Creation

a. Bulkhead Construction. Disposal in the intertidal cove in upper Black Rock Harbor would require construction of a steel bulkhead to retain the deposited sediments. Sections of the bulkhead would have to be "driven" into the sediments for stabilization. This would be accomplished by a pile driver mounted on a barge. Work at the site would cause temporary and localized siltation at the site and in the upper harbor area. Siltation levels would return to normal levels after construction ceases.

b. Filling of the Site. A hydraulic pipeline dredge would be used to deposit the dredged materials from Section "2" of the Black Rock Harbor sediments. The sediment/water mixture would be pooled behind the closed bulkhead until the sediments have sufficiently settled in the area. Studies are now being accomplished on the sediments to determine whether intermittent or continuous pumping of the sediments would be done. The determination would be based on settling rates and the configuration of the area enclosed by the bulkhead. Intermittent dredging may take one to two weeks to fill. The water above the settled sediment would be periodically released from the weir throughout the settling period. The effluents would be closely monitored as part of the FVP study for any released contaminants.

Elutriate tests were done on Black Rock Harbor sediments to indicate potential release of contaminants. This test involves mixing the sediment samples with four parts seawater to simulate the discharge of hydraulic dredging. The mixture is shaken for 30 minutes and is allowed to settle for one hour. The filtered elutriate is then analyzed for sediment contaminants and compared with the water sample taken from the dredge site.

Elutriate tests were performed on sediments from 3 sample sites in Section "2" of Black Rock Harbor, PE-1-79, PE-2-79 and PE-5-79. These are included in Table 10. The results at each of these Stations indicates potential but small releases of sulfates, mercury and zinc. PCB analyses were not done on this section of the harbor channel. Elutriate testing of a downstream site, PE-3-79, indicates this substance would also be released into the water above the settled sediments. Releases of effluents from the cove into the harbor would temporarily increase the concentration of these contaminants in the harbor waters. Chemical analyses of the harbor waters EW-1-79, EW-2-75, EW-3-79, indicate that background and test mercury concentrations slightly exceeded the instantaneous water quality standards, established by EPA (1980), 0.0037 ppm. Zinc concentrations were within the water quality standards of .058 ppm. No instantaneous standards have been established for PCB's. Levels should not exceed an average of 0.03 ppb over a 24 hour period. Acute toxicity occurs at 10 ppb. The background PCB concentration in the harbor water was 14 ppb. Tidal flushing of the harbor is expected to dilute these released contaminants down to existing water quality conditions.

c. <u>After Disposal</u>. Once the sediment is settled, the weir which would be located in the eastern half of the bulkhead would be opened to allow the intertidal wetland area to be flushed with each tidal cycle. The wetland area would be a 50 x 50 ft. plot located behind the weir. The remainder of the filled area would be at upland elevations. The tidal flushing may leach out contaminants associated with the exposed sediments. This tidal effluent would be monitored for metal levels, PCB's and a number of other organic compounds and nutrients. The surface runoff and ground water around the site would also be monitored for leaching of any sediment contaminants.

TABLE 10

Results of tests performed on: (1) the standard elutriate resulting from the "shake test" using 1 part sediment from various sampling locations with 4 parts water from each sampling location and (2) the virgin wter from each sampling location are as follows:

	Black Rock Harbor							
	Water Sample	Elutriate From Sediment Sample*	Water Sample	Elutriate From Sediment Sample*	Water Sample	Elutriate From Sediment Sample*	Water Sample	Elutriate From Sediment Sample*
	EW-1-79	PE-1-79	EW-2-79	PE-2-79	EW-3-79	PE-3-79	EW-4-79	PE-4-79
Test Property								
Nitrite Nitrogen (N), ppm	0.21	0.043	0.21	0.021	0.015	0.021	0.050	0.022
Nitrate Nitrogen (N), ppm	1.23	0.10	1.89	0.07	0.14	0.09	0.12	0.05
Sulfate (SO_4), ppm	1910	2140	1860	1683	2080	2090	2000	2070
Oil and Grease, ppm	<1	<1	<1	<1	<1	<1	<1	<1
Phosphorus (P)								
Ortho, ppm	0.18	0.18	0.32	0.33	0.05	0.06	0.06	0.05
Total, ppm	0.20	0.05	0.38	.04	0.06	0.08	0.07	0.06
Mercury (Hg), ppm	0.004	0.007	0.004	0.009	0.005	0.009	0.003	0.013
Lead (Pb), ppm	<0.005	0.005	<0.005	<0.005	<0.005	0.005	<0.005	<0.005
Zinc (Zn), ppm	0.020	0.041	0.005	0.0155	<0.005	0.028	<0.005	<0.022
Arsenic (As), ppm	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cadmium, (Cd), ppm	<0.005	<0.005	0.006	<0.005	0.006	<0.005	0.006	<0.005
Chromium (Cr), ppm	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Copper (Cu), ppm	0.008	<0.005	0.022	<0.005	<0.005	0.012	<0.005	0.012
Nickel (Ni, ppm	0.024	<0.005	<0.052	<0.005	0.026	<0.006	0.26	<0.006
Vanadium (V), ppm	<0.025	--	<0.025	--	<0.025	<0.025	<0.025	<0.025
Total PCB, ppb	--	--	--	--	14	22	--	--

TABLE 10 (Cont'd)

	Black Rock Harbor						Bridgeport Harbor	
	Water Sample	Elutriate From Sediment Sample*	Water Sample	Elutriate From Sediment Sample*	Water Sample	Elutriate From Sediment Sample*	Water Sample	Elutriate From Sediment Sample*
	EW-5-79	PE-5-79	EW-6-79	PE-6-79	EW-7-79	PE-7-79	EW-4-79	PE-4-79
Nitrite Nitrogen (N), ppm	0.062	0.040	0.211	0.027	0.211	0.073	0.013	0.015
Nitrate Nitrogen (N), ppm	1.44	0.05	1.15	0.015	1.20	0.14	0.10	0.11
Sulfate (SO_4), ppm	1870	1860	1370	1363	1610	1570	1900	1950
Oil and Grease, ppm	<1	<1	<1	<1	<1	<1	<1	<1
Phosphorus (P)								
Ortho, ppm	0.17	0.17	0.44	0.45	0.26	0.01	0.06	0.18
Total, ppm	0.18	0.04	0.47	0.01	0.29	<0.01	0.10	0.47
Mercury (Hg), ppm	0.0002	0.014	0.005	0.013	0.004	0.01	0.036	0.005
Lead (Pb), ppm	<0.005	<0.025	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc (Zn), ppm	0.012	0.029	0.200	0.041	0.081	0.044	<0.005	<0.005
Arsenic (As), ppm	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Cadmium, (Cd), ppm	<0.005	<0.005	<0.005	<0.005	0.012	<0.005	0.005	0.052
Chromium (Cr), ppm	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Copper (Cu), ppm	<0.005	<0.008	0.006	<0.009	0.009	<0.005	<0.005	0.012
Nickel (Ni, ppm	0.029	0.009	0.079	0.021	0.042	0.139	<0.036	0.008
Vanadium (V), ppm	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	0.025
Total PCB, ppb	--	--	--	--	--	--	<18	4.2

*Average of three replicate analyses.

-- Not Analyzed

The intertidal and upland areas would be experimentally planted with Spartina alterniflora and other vegetation. The availability of sediment contaminants to the plants would be studied over a five year period. Laboratory studies by Folsom et al. (1981) have indicated that plant uptake of metals in Black Rock Harbor and other sediments were not significantly different from plants in naturally occurring marshes. The moisture content and calcium carbonate levels were found to affect uptake. When the soils were dried and oxidized, the contaminants associated with organic matter were released upon decomposition and made available to plants. The purpose of the FVP study would be field verification of these results. Another aspect of this study would be uptake of sediment contaminants by sediment-feeding invertebrates in the proposed marsh and upland areas. The lugworm Arenicola and the common earthworm Lumbricus have been chosen for study.

The site would be available for forage by shorebirds, gulls and wading birds that have used the mudflat in the past. Studies on the lugworm should indicate any potential problems with contamination of prey species. However, it must be noted that most other contaminated habitats including the landfill and the existing mudflats are already available to these foragers.

The land created by filling the cove area will become the property of the adjacent owners, the State of Connecticut to the east and O&G Industries, Inc. to the west. Following completion of the FVP, O&G will use their portion of the created upland to stockpile sand and gravel. On the State land, the weir structure would be removed and steel sheeting replaced to complete the bulkhead. The wetland area would be filled in so that all the created land in the eastern half of the cove will be at upland elevations. The State may use the property for future expansion of the facilities of the Resource Recovery Station.

2. Open Water Disposal at the Central Long Island Sound Disposal Site.

a. The Action of Disposal. The dredged material is released through bottom opening doors in the scows and deposited at the dump site. The movement of sediments through the water column has been described by Gordon (1977). Briefly, upon release from the scow, the dredged material generally descends rapidly to the bottom. The speed of decent and the size of the bottom spreading depends on many factors, including the mechanical properties of the sediment, water content of the sediment, depth, bottom conditions, ambient currents, etc. Gordon also indicated that ambient current conditions are important because such a large volume of ambient water is collected during decent that the material flow will acquire the ambient lateral velocity of the water. Upon impact, a turbidity (density driven) current will be set up which will spread outward until friction forces cause it to halt.

The dredged sediments derived from Section "2" of the Black Rock Harbor channel (about 70,000 c.y.) would be point dumped in the northeastern area of the Central Long Island Sound (CLIS) disposal site. Predisposal, disposal and post disposal conditions at this uncapped mound would be identified and assessed under the proposed FVP research program and integrated with various laboratory studies. The remainder of the sediments, derived from Sections "1", "3", the permit from Black Rock Harbor and those from the Bridgeport Harbor Anchorage area (totalling about 155,000 c.y.) would be deposited in a separate mound at the site and capped with material from either outer New Haven Harbor or the mouth of the Connecticut River. Depending on the physical similarity of the cap material with the harbor sediments, comparisons of the uncapped and capped mounds may be integrated into the research program.

b. Generic Impacts of Open Water Disposal. Generic discussion of the impacts of open-water disposal and disposal at the Central Long Island Sound Disposal site (CLIS) may be found in the Programmatic Environmental Impact Statement for the Disposal of Dredged Material in the Long Island Sound Region. The details of the generic discussion will not be repeated here. A summary of the major concerns are presented in Table 11. This section will focus on impacts related to the sediments of this particular project.

c. Contaminant Release to the Water Column. The dredged sediments would be mixed with the water column during disposal activities. This would expose the anaerobic sediments into the oxygenated water column which may release sediment contaminants. Elutriate tests were accomplished on sediment samples from Black Rock and Bridgeport Harbors in 1979-1980 (Table 10). The sample sites are located in Figures 2-6. Elutriate tests were not performed on sediments at the Bridgeport Anchorage Area; however, such tests were performed on sediments from sample site PE-4-79 in close proximity to the area to be dredged. It can be considered representative of the Anchorage Area sediments.

Although this test was designed to approximate worst case conditions using a hydraulic dredge, open water disposal of material dredged by a clamshell dredge would not approach the mixing typical of hydraulic dredge discharges. Thus the actual values are considered to overestimate the actual releases that could be expected. The data in Table 10 indicates that mercury, zinc, nickel and vanadium would be released from sediments in Section "1" of the Black Rock Channel (PE-6,7-79), sulfate, mercury and zinc in Section "2" (PE-1,2-79) and nitrates, sulfate, orthophosphate, mercury, lead, zinc, copper and PCB's in Section "3". Nitrates, sulfates, phosphates and nickel were released from sediments near the Anchorage Area in Bridgeport Harbor.

TABLE 11

Summary of Generic Impacts of Open Water Disposal at Central Long Island Sound Disposal Site

Topography:	Creation of sediment mounds at site.
Water Quality:	Localized turbidity; short term depression of dissolved oxygen; short term and localized release of sediment contaminants; potential localized increase in plankton productivity.
Sediment Quality:	Increase in sediment contaminants at disposal site.
Benthos:	Burial of existing organisms and habitat within discharge area (250 ft. radius); temporary and local loss of benthic productivity; potential short term bioaccumulation of release contaminants by filter-feeders; potential for enhancement of productivity (via added sediment nutrients).
Fisheries:	No shellfisheries at disposal site; burial of limited finfish and lobster populations within discharge area. Potential short-term bioaccumulation.

The increases in mercury at the sites in Section "2" and PE-3-79 of Section "3", and lead at site PE-3-79 were relatively minor in magnitude. Because these are overestimates, it is questionable that the releases would, in fact, occur. The values of mercury are above the water quality criteria for that metal in sea water (0.0037 ppm). The release of PCB's from sediment sample PE-3-79 also would be above the toxicity limits of this substance in seawater. Both these substances would be diluted by the large amount of available water at the disposal site and, therefore, would be be expected to return to predisposal levels soon after the disposal operations ceased.

d. Potential Toxicity and Accumulation of Contaminants. The above described release of sediment contaminants into the water column would make these contaminants more available to biological resources in the vicinity of the discharge area. Dissolved metals or organic compounds could be toxic or accumulated by organisms.

The Ocean Dumping Criteria must be applied to evaluating the project sediments since the proposed disposal site is in Long Island Sound waters and the project is greater than 25,000 c.y.

The laboratory bioassay procedures outlined in the Implementation Manual (EPA/CE, 1977) are intended to simulate the liquid, suspended solid and solid phases of dredged sediment that is to be dumped by barge at open water or ocean disposal sites. Three types of sensitive marine organisms are utilized in each of these tests. The results are statistically analyzed to determine whether any observed acute toxicity was the result of the test sediments. The tissues of surviving animals from the solid phase tests are also analyzed to determine if any significant accumulation of constituents of concern, namely cadmium, mercury, petroleum hydrocarbons (PHC's), PCB's, or DDT occurred. If any statistically significant uptake is found, then a determination is made as to its potential effects on other marine organisms or on man in an attempt to predict what may result if organisms having similar test value concentration of a given contaminant are consumed.

The bioassay and bioaccumulation tests on both Black Rock and Bridgeport Harbors were performed in 1980 by Energy Resources Company (ERCO) Inc. of Cambridge, Massachusetts. The test documents are available from this office upon request. A summary of the results are presented here. The sample sites for each harbor are shown in Figures 3, 4, 5 and 6.

Black Rock Harbor Sediments:

Sediments derived from Section "2" of Black Rock Harbor are represented by testing of sample sites "A" and "B" (Figures 3 & 4). Site "C" would be an indicator of the sediments from Section "1". Statistical analyses of the bioassay data of all three sites show that the liquid suspended solid and the solid phases of the material will not be exceeded when dumped. Analysis of the bioaccumulation data shows that statistically significant uptake of PHC's, PCB's and DDT occurred in the test clams (Mercenaria mercenaria) and sand worms (Nereis virens) when exposed to sediment from sites "A" and "B".

Such accumulation was not seen in tests on sediments from sample Site C. There was no significant accumulation of cadmium or mercury shown in any of the test species for all sample sites. The tissue concentrations of the significant accumulations are shown in top portion of Table 12.

Bridgeport Harbor Sediments:

Sediments from Bridgeport Harbor were also subjected to the above described testing.

This material from the harbor anchorage area will be disposed with the materials derived from Sections "1" and "3" (including the private dredging in Section "1") at a single mound at the Central Long Island Sound Disposal site. Sediments from three sample locations in Bridgeport Harbor were tested but only the results of the site closest to the anchorage area (Site B, Figure 6) are discussed for the purpose of this evaluation. An analysis of the liquid, suspended solids and solid phase data indicates there are no statistically significant mortalities due to any of the phases of material when discharged at the CLIS site. An analysis of bioaccumulation data shows that only PHC's are accumulated in statistically significant concentrations by the sandworm Nereis (Table 12). No significant accumulation of mercury, cadmium, PCB's or DDT is shown in the other test species.

Evaluation of the Accumulation Data:

The bioaccumulation tests data indicated that Nereis exhibited significant accumulation of PHC's, PCB's, and DDT whereas Mercenaria accumulated PCB's and DDT. Both species are available as prey to predator marine organisms whereas only Mercenaria is directly consumed by man.

The accumulation of petroleum hydrocarbons by a deposit-feeder such as Nereis may be of little consequence to the ecosystem and to man. This accumulation would only be significant if PHC's are magnified to higher trophic levels within aquatic ecosystems. Such magnification has not been observed to occur in marine communities (Conner et al., 1979). Burns and Teal (1973) indicated the fish, a major predator of polychaetes, accumulate available PHC's primarily from the water column via their gills rather than from food sources. The observed accumulation, therefore, may be of minor consequence to the community near the discharge area. No release of oil and grease substances were detected in the elutriate tests (Table 10). These substances have a strong affinity for the sediments and probably would not cause any long term effect at the disposal site.

TABLE 12

Tissue Concentrations* of Significantly Accumulated Sediment Contaminants of Species Exposed to Black Rock Harbor and Bridgeport Harbor Sediments

Site	Species	Body Burden		
		Petroleum Hydrocarbons (PHC's)	Polychlorinated Biphenyls (PCB's)	DDT
Black Rock Harbor				
A	*Nereis virens*	57.6	0.21	0.002
	Mercenaria mercenaria	--	--	0.0071
B	*Mercenaria mercenaria*	--	0.127	--
Bridgeport Harbor				
B	*Nereis virens*	81.0	--	--

*Values listed in ug/g tissue (ppm).

Nereis also exhibited significant accumulation of PCB's and DDT. This occurred only in sample Site A from Black Rock Harbor. The observed accumulation of PCB's may be of little consequence to the disposal site community. Chytalo (1979) compared PCB concentrations in the tissues of the two polychaete species, Nepthys incisa and Pectinaria gouldii, with those of the inhabited sediments at three dredged material disposal sites in Long Island Sound. This may indicate long term accumulation potential from disposal site sediments. The tissue levels (<1 part per billion (ppb)) were well below sediment concentrations (0.17 -0.48 ppm) although only a small number of worms were available for testing. Comparison of these values with tissue levels in predatory fish led Chytalo to conclude that the polychaetes probably were not a significant "route" for the transfer of PCB's in the sediments to the estuarine food web. The values exhibited by Nereis in the bioaccumulation test are probably more related to accumulation from the water column. Accumulation of contaminants by the genus Nereis has been shown to be significantly higher (up to 1000x) from the water column than from the sediments (Ueda et al. 1976, 1977; Beasley and Fowler, 1976). Disposal activities do cause temporary increases in PCB levels (Arimoto and Feng, 1980; Pavlou et al., 1978). These studies indicated levels do return to background levels after disposal activities cease. This temporary release into the water column may be responsible for the accumulation levels exhibited by Nereis. Thus, that level of accumulation would not be expected to occur over the long term and probably would be of little consequence to organisms near the discharge area.

The level of DDT accumulated by Nereis was 2 ppb. Because the concentrations are considered extremely low and occurred only at Site A, its impact on the disposal site is considered minor.

Mercenaria is a filter feeding organism that is directly consumed by man. Significant accumulation of PCB's were observed in test animals exposed to sediments from Site B at Black Rock Harbor. PCB's are toxic to humans. Based on this fact, the Food and Drug Administration imposes action levels on consumable food such as shellfish. The action levels for PCB's are 5 ppm. This is almost 40 times the mean test values exhibited by Mercenaria and, therefore, the clams are considered safe for human consumption. Thus, while the uptake is statistically significant it may be quantitatively insignificant. Similarly, Mercenaria accumulated DDT from exposure to sediments from Site A in the harbor. The FDA action levels for shellfish are also 5 ppm. This is 700 times the mean test value observed in the clam tissues. It is also safe to consume and may be quantitatively insignificant.

e. Relationship of this Project to the Proposed Research Program. Based on the above discussion, there is the potential for the disposal of sediments to cause some temporary accumulation in organisms in the vicinity of the disposal site. However, this accumulation is generally related to contaminants released or made available to the aquatic environment by disposal activities and, therefore, should only occur during the disposal period. There is no evidence to indicate that dredge material disposal results in longer term accumulation. However, further study on the subject is warranted.

The proposed FVP research study would further define the potential for long term accumulation by organisms and its effect marine ecosystem. The Black Rock Harbor maintenance dredging project is suitable for this study in part because of the nature of the sediment contamination. The research project would accomplish detailed bioaccumulation studies of sediment contaminants in both the laboratory and the field. The study would also assess sublethal physiological effects and their significance to selected organisms and their populations. The entire study involves ten separate but integrated projects described in Table 13. The study would involve close monitoring of the disposal site throughout the study period. If it was determined that adverse impacts were imminent, then mitigation steps would be taken immediately to protect the environment. This would involve capping the exposed mound with cleaner material to isolate the contaminants from any biological resources. The study plan would then be altered to accommodate the new conditions. A comparative study between the uncapped and capped mound may be added to the study at a later date. In either case, the study would insure that the marine environment in the disposal area and its associated biological resources are protected from adverse impact.

TABLE 13

Proposed Projects of the Field Verification Program

1. Chemical Analysis of Black Rock Harbor sediments.

2. Development and verification of a laboratory exposure system to field conditions.

3. Bioaccumulation studies with selected organisms.

4. Laboratory and field studies of the fate and transport of contaminants of biological concern at disposal site.

5. Development of manual for short-term predicative test to assess acute effects on marine invertebrates and fish.

6. Sublethal physiological effects of benthic animals in laboratory and field.

7. Sublethal effects on caged mussels with regard to tissue residues.

8. Histopathological effects on marine organisms to determine survival, growth and reproductive potential.

9. Field study at the Central Long Island Sound Disposal Site to establish baseline (predisposal) conditions and determine specific effects of disposal on the types, levels and partitioning of chemicals during and after disposal.

10. Field study at disposal site to establish baseline (predisposal) benthic community conditions and determine the effects on specific populations and community structure.

VI. COORDINATION

Coordination of a maintenance dredging proposal for Black Rock Harbor-Cedar Creek has been ongoing since the fall of 1980. In December 1980, a project proposal and draft Environmental Assessment were presented to the Dredging Management Committee of the then existing New England River Basins Commission (NERBC). The Committee was comprised of representatives of this office, NERBC, U.S. EPA, U.S. Fish and Wildlife, National Marine Fisheries Service, Connecticut Department of Environmental Protection, New York Department of Environmental Conservation and the U.S. Coast Guard. The proposal included dredging to full project dimensions and disposing of approximately 425,000 cubic yards of sediment at the Central Long Island Sound Disposal Area. Capping of the Black Rock Harbor-Cedar Creek sediment was not proposed except if post-disposal monitoring determined a need. The proposal also included initial construction of a berm at the open water site that would be comprised of less contaminated (Class I & II) dredged materials. The basin eventually created by the berm would serve as a receptacle for more contaminated (Class III) sediments. Comments from all the previously mentioned agencies were unfavorable concerning this proposal (see Section VIII, Appendix for coordination letters).

Subsequent coordination was conducted with the Connecticut DEP, the City of Bridgeport and project users concerning reduction of project dimensions and disposal alternatives. As a result, the project was reduced in scope to provide the dimensions described previously.

Prior to coordination of this proposal, the concept of the Field Verification Program (FVP) was developed. Coordination of the FVP to date has included discussions with representatives of the Connecticut DEP Water Resources Unit and the Coastal Area Management. Organization meetings between representatives of the New England Division (NED), Waterways Experiment Station, WES, and Environmental Research Laboratory, Narragansett (ERLN), have been held during the past six months. On May 22nd, 1982, a description of the FVP was presented at the State of the Sound Conference at SUNY. On June 10th, 1982 a public presentation of the FVP program was made at the ERLN with representatives of Federal, State agencies and research institutions.

Coordinating Agencies, Departments and Individuals

U.S. EPA

a. Region I (Boston)
b. Environmental Research Lab Narragansett (ERLN)

U.S. Fish and Wildlife Service

National Marine Fisheries Service

Connecticut Department of Environmental Protection

a. Water Resources Unit
b. Coastal Area Management (CAM)

New York Department of Environmental Conservation

Connecticut Resource Recovery Authority

City of Bridgeport

a. City Engineer
b. Harbormaster
c. Board of Aldermen (Ecology Committee)
d. Zoning Department

O&G Industries

Inland Fuel Terminal, Inc.

Crowley Terminal

Consumer Petroleum

D'Addario Industries

Santa Fuel

Long Island Sound Task Force

Comments Requested Mailing List

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President
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Santa Fuel, Inc.
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Development Administration
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Mr. Gordon Beckett
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Comments Requested Mailing List (Cont'd)

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Mr. Joseph P. Trantino
Deputy Transportion Commissioner
State Department of Transportation
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State Pier
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Boston, MA 02114

Mr. Hillard Bloom
Bloom Bros./Talmadge Bros., Inc.
132 Water Street
South Norwalk, CT 06854

Connecticut Commercial Fisherman's
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Fairfield, CT 06430

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Mr. Marshall Case
National Audubon Society
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Long Island Sound Taskforce
Stamford Marine Center
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Stamford, CT 06902

VII. REFERENCES

Arimoto, R., and S.Y. Feng. 1980. Changes in the levels of PCB's in Mytilus edulis associated with dredge spoil disposal. DAMOS contribution #10. Marine Sciences Institute, University of Connecticut, Groton, Connecticut, submitted to Corps of Engineers, New England Division, Waltham, MA.

Beasley, T.M. and S.W. Fowler. 1976. Plutonium and Americum: Uptake from Contaminated Sediments by the Polychaete, Nereis diversicolor. Marine Biology 38: 95-100.

Bohlen, W.F., D.F. Cundy and J.M. Tramontano. 1979. Suspended Material Distributions in the Wake of Estuarine Channel Dredging Operations. Estuarine and Coastal Marine Science 9: 699-711.

Burns, K.A. and J.M. Teal. 1973. Hydrocarbons in the Peglagic Sargassum Community. Deep-Sea Research 20: 207-211.

Center for the Environment and Man, Inc. (CEM). 1982. Biological Survey of Bridgeport Harbor, Black Rock Harbor and Adjacent Environments. Contract DACW 33-80-C-0118 to the Corps of Engineers, New England Division, Waltham, MA.

Chytalo, K.N. 1979. PCB's in Dredged Materials and Benthic Organisms in Long Island Sound. M.S. Thesis SUNY Stony Brook, NY, 109 pp.

Conner, W.G., D. Aurand, M. Leslie, J. Slaughter, A. Amr, F.I. Ravenscroft. 1979. Disposal of Dredged Material within the New York District Vol. 1, Present Practices and Candidate Alternatives. Prepared for U.S. Army Corps of Engineers, New York District, NY.

Corps of Engineers, New England Division (CE). 1980. Environmental Atlas of New England Channel and Harbor Bottom Sediments. Volume I. Federal projects within Long Island Sound Fishers Island Sound.

Corps of Engineers (CE). 1981. Appendix A to the Draft Programmatic Environmental Impact Statement for the Disposal of Dredged Material in the Long Island Sound Region. Environmental Impact Report. Open Water Disposal of Dredged Material in Long Island Sound, Block Island Sound and Adjacent Waters. Prepared by Dames & Moore, Inc. for Corps of Engineers, New England Division, Waltham, MA.

Corps of Engineers (CE). 1982. Final Programmatic Environmental Impact Statement for the Disposal of Dredged Material in the Long Island Sound Region. Corps of Engineers, New England Division, Waltham, MA.

Cortell, J.M. & Associates, Inc. 1976. Biological Monitoring and Training Program for the State of Connecticut Department of Environmental Protection, Water Compliance Unit. Final Report.

Environmental Protection Agency (EPA)/Corps of Engineers (CE). 1977. Ecological Evaluation of Proposed Discharge of Dredged Material into Ocean Waters. Environmental Effects Laboratory, U.S. Army Engineers Waterways Experiment Station, Vicksburg, MS.

Folsom, B.L., Jr., C.R. Lee, and D.J. Bates. 1981. Influence of Disposal Environment on Availability and Plant Uptake of Heavy Metals in Dredged Material. Technical Report EL-81-12. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Gordon, R.B. 1974. Dispersion of Dredge Spoil Dumped in Near-Shore Waters. Estuarine and Coastal Marine Science 2:349-358.

Gordon, R. 1977. Movements of Dredged Material. Dredged Material Research Notes, News, Reviews. U.S. Army Engineers Waterways Experiment Station, Vicksburg, MS.

Loosanoff, V.L. 1961. Effects of Turbidity on Some Larval and Adult Bivalves. Proc. Gulf Carib. Fish. Inst. 14-80-95.

Loosanoff, V.L. 1965. The American or Eastern Oyster. U.S. Fish and Wildlife Service. Circular 205. 36 pp.

McCauley, J.E., R.A. Parr, and D.R. Hancock. Benthic Infauna and Maintenance Dredging: A Case Study. Water Research 11:233-242.

New England River Basins Commission (NERBC). 1980. Interim Plan and Final Environmental Impact Statement for Disposal of Dredged Material in Long Island Sound.

Normandeau Associates, Inc. 1973. Bridgeport Harbor Ecological Studies 1971-1972. Biological and Hydrographic Study Reports. Prepared for United Illuminating Company, Bridgeport, CT.

Pavlou, S.P., R.W. Dexter, W. Hom, R.J. Hafferty, and K.A. Krogslund. 1978. Aquatic Disposal Field Investigations, Duwamish Waterway Disposal Site, Puget Sound, Washington. Appendix E: Release and Distribution of Polychlorinated Biphenyls Induced by Open-Water Dredge Disposal Activities. DMRP Technical Report D-77-24. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Stout, V.F. and L.C. Lewis. 1977. Aquatic Disposal Field Investigation Duwamish Waterway Disposal Site Puget Sound Washington. Appendix B: Pole of Disposal of PCB - Contaminated Sediment in the Accumulation of PCB's as Marine Animals. DMRP Technical Report D-77-24. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Thomson, K.S., W.H. Weed, III, and A.G. Taruski. 1971. Saltwater Fishes of Connecticut. State Geol. and Natural Hist. Surv. of Conn. Bull. 105. 165 pp.

TRC, Inc. 1977. Draft Environmental Report for Maintenance Dredging at Bridgeport Harbor Connecticut TRC Project No. 82751. Unpublished Report prepared for Corps of Engineers, New England Division. 74 pp.

Ueda, T., R. Nakamura, and Y. Suzuki. 1976. Comparison of ^{115}Cd accumulation from sediments and sea water by polychaete worms. Bull. Jap. Soc. Sci. Fish. 42:299-306.

Ueda, T., R. Nakamura and Y. Suzuki. 1977. Comparison of influences of sediments and seawater on accumulation of radio-nuclides by worms. J. Radiation Res. 18:84-92.

Verses, C.J., R.J. Chriss and W.T. Gnewuch. 1976. Benchmark Establishment and Water Quality Monitoring in the Bridgeport and Black Rock Harbor Systems. NECUS.

Windom, H.L. and R.R. Stickney. 1972. Research to Determine the Environmental Response to the Deposition of Spoil. on Salt Marshes using Diked, and Undiked Techniques. Skidway Institute of Oceanogr. Savannah, GA. 373 pp.

Windom, H.L. 1973. Processes Responsible for Water Quality Changes During Pipeline Dredging in Marine Environments. Proc. World Dredging Conf. (WODCOW Assoc., San Pedro, CA) 5:761-806.

VIII. APPENDIX

Coordination Letters

New York State Department of Environmental Conservation
50 Wolf Road, Albany, New York 12233

Robert F. Flacke
Commissioner

January 14, 1981

Mr. Charles Schwerin
New England River Basin Commission
141 Milk Street, 3rd Floor
Boston, Massachusetts 02109

Dear Chuck:

As a follow-up to my phone conversation with John Sailor on Tuesday, January 13, 1981 this letter is confirmation of New York's concerns relative to the Corps' Black Rock Harbor Proposal and it's relation to the Interim Plan. New York's position is as follows:

1. The proposal for disposal of Class III material is contrary to the requirements of the Interim Plan.

2. Disposal of Class III material without capping compromises the Interim Plan and sets an undesirable precedent.

3. The proposal for an experiment is viewed as a means to make an unnecessary exception to the Plan.

4. New York has consistently and repeatedly requested that the Corps should investigate and evaluate the long range effects on historical dump sites such as Eatons Neck or Stamford. This is a viable alternative to the monitoring of the Black Rock spoil.

5. New York's position is that if there is no viable alternative for disposal other than open water disposal, then the disposal shall be in accordance with the Interim Plan and the Class III material should be capped.

6. It would also be appropriate to develop the impact and provisions of S 1148, reauthorization of the Marine Protection, Research and Sanctuaries Act (Ocean Dumping Act) on this proposal and on the Interim Plan. This Act contains an amendment which requires compliance with the testing criteria for toxic pollutants under the provisions of the Ocean Dumping Act for disposal of dredged spoils in Long Island Sound.

I trust that you will forward our comments to the Corps and to the other members of the Dredging Management Committee. As a particular point I should like to reiterate our expression for the need to survey the long range impact on the historical sites which we have been urging the Corps to do for four or five years. If you have any questions please do not hesitate to call me.

Sincerely,

Randolph M Stelle

Randolph M. Stelle, P.E.
New York State Member
Dredging Management Committee

RMS:cbc

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203

January 16, 1981

Mr. Chuck Schwerin
New England River Basins Commission
141 Milk Street
Boston, Massachusetts 02109

Dear Mr. Schwerin:

We have completed a preliminary review of the proposed Black Rock Harbor Navigation Project in Bridgeport, Connecticut. The project involves dredging 425,000 cubic yards of material with disposal at the Central Long Island dredged material disposal site.

The Corps proposed that the Class III material from Black Rock be enclosed behind a triangular berm to be constructed from Class I and Class II sediment from the same project, as well as additional material from other projects, notably the Norwalk maintenance project. The berm would be completed over a 5-10 year period, during which time the uncapped Class III material would be monitored for environmental impact. It is the position of the Corps that the proposal as submitted is consistent with the guidelines of the Interim Plan.

Based upon the information we have been provided with, we do not think the proposal is totally consistent with the Interim Plan. We do not know the long term impact of uncapped disposal of the Class III material. The information provided on the monitoring program does not contain sufficient detail to determine its suitability to answer questions on potential harm of this disposal technique.

Our main concern is the potential harmful accumulation of PCB's in the marine environment and the human food chain. We need more information on this monitoring program and on the potential availability of capping material. Also, we should consider other pending dredging projects which are intended to be disposed of at this disposal site.

[illegible] that the environmentally protective approach to this [illegible] the Class III sediments with cleaner material in order to [illegible] it from biological availability thus reducing the potential [illegible] bioaccumulation and biomagnification. We need to determine the current scientific knowledge concerning PCB bioaccumulation from dredged material to thoroughly review the Black Rock Harbor evaluation.

Sincerely,

[signature]

Allen J. Ikalainen
Chief, Special Permits Development Section

cc: Vyto L. Andreliunas, COE Waltham, MA
Michael Ludwig, NOAA/NMFS
Chris Mantzaris, NMFS, Gloucester, MA
William J. Neidermyer, USF&WS, Concord, NH
Carl Schwartz, USF&WS, Newton, MA

Santa FUEL, INC. 154 ADMIRAL STREET, BRIDGEPORT, CONN. 06605 367-3661

January 27, 1981

Department of the Army
New England Div., Corp of Engineers
424 Trapelo Road
Waltham, Massachusetts 02254

Attention: Fran Donovan

Dear Fran:

I am writing in reply to your letter dated 12/30/80, concerning the proposed dredging of Black Rock Harbor. I would like to describe our needs to the best of my ability.

We anticipate receiving about fifty barges or motor vessels this year. Our records indicate that the barges draw between 12 and 14 feet according to the size of their load. The larger tugs draw about 16 feet of water. The 18 ft. depth that you expect to dredge to would not be too much beyond our immediate needs. Anything less would be inadequate.

At this time we are experiencing complaints from the tug captains concerning the shallow spots in the creek. Also the threats of making our deliveries limited by the tide.

Please give me a call if any further information is required.

Sincerely,

Donald F. Santa

Donald F. Santa

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

March 3, 1981

Mr. V. L. Andreliunas, Chief
Operations Division
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

RE: Black Rock Harbor Navigation Project
Bridgeport, Connecticut

Dear Mr. Andreliunas:

I have finally reviewed the preliminary proposal to maintenance dredge The Black Rock Harbor Federal Channel and to dispose upwards of 500,000 cubic yards of sediment at the Central Long Island Sound Regional Disposal Site south of New Haven. This proposal was the subject of a meeting of The Dredging Management Committee in Boston on December 1st of last year.

The bulk inventory, bioassay, and bioaccumulation studies undertaken for this project are comprehensive in terms of describing the colligative and certain statistical properties of the material to be dredged. We know it is highly enriched with a variety of substances having anthropogenic origins which have the potential for adversely impacting the disposal site environment. However, the studies do not enlighten one on the environmental consequences of the proposed disposal design. I could not recommend that we go forth with the project without significant modifications in both the scope of the dredging and disposal design.

There are several flaws in the current proposition which I believe are correctable. Foremost is the assumption of need to dredge the entire authorized project. My cursory review of users and the available channel condition surveys suggest that only one commercial user is experiencing significant problems. Your records should be able to confirm this as well as accurately delineate the nature of existing navigation difficulties for existing users. This information should be used to delineate those areas which <u>need</u> to be dredged inorder to eliminate <u>significant</u> navigation hazards experienced by users. My Office has no objection to the dredging itself provided temporal constraints to guard oyster resources are held.

Another flaw in the current proposal flows from the proposition that the material will not disperse (i.e. spread laterally) from where it is dumped and if it in fact does disperse, that the Corps would do something about it. The underlying basis for this posture is a somewhat hastily conceived dump site management strategy: construction of underwater berms with the contaminated Black Rock sediments and failing that (ie significant lateral

Phone:

State Office Building, Hartford, Connecticut 06115

spreading or dispersal occurs), capping and/or constructing berms with suitable material from other dredge projects or material from a nearby borrow area.

The problem is not with the underwater berm concept. Indeed The Interm Plan (pp. 22-23, Par. C. 1.b.) provides for this management tool. The problem is that there is no evidence to support the proposition 1.) that significant lateral movements will not occur during the 5-10 years it may take to complete berming, and 2.) that if spreading does occur, that the Federal Government would have the resources to detect it in a timely fashion and correct the situation before significant adverse impacts result. (The assumption here is that significant lateral spreading is unacceptable.) It is my opinion that the above constraints suggest we should not pursue the proposed dump site management strategy utilizing The Black Rock project material. The nature of the sediments and apparent absence of a vital need to dredge the entire authorized project, indicate to me that potential environmental risks of the proposal outweigh the anticipated benefits.

I believe The Dredging Management Committee's concern about Interim Plan consistency centers on the capping issue as it relates to Class III material. Most of us would agree that capping or covering over of contaminated dredged material is a prudent procedure. I don't believe there is agreement however, on how long a pile of Class III material should sit on the bottom before it is necessary to cover over the pile with a cap. If the primary purpose of the cap is to shield the pile from the erosional forces of storm events, we should know what statistical risks exist for significant erosional events (spreading) on an uncapped Class III pile under various time frames. Then perhaps we would be able to judge whether or not the risks are acceptable in disposing Class III material without immediate capping when there are assurances that capping will in fact be done via another project within a specified period of time. The Dredging Committee and the Corps should pursue this matter, especially as it relates to the required assurances that cap material will be available at some future date.

For example, with the current Black Rock Harbor proposal which involves perhaps 400,000 cubic yards of Class II & III material, it could take upwards of 1,200,000 cubic yards of cap material to adequately cover it over. Where would this material come from and would there be funds available to obtain it if significant spreading was observed? (Or, if spreading was in fact observed, would the Dredging Committee bog itself down trying to determine whether or not it was significant?) How quickly could the cap material be obtained once it was determined that capping was necessary? In my opinion these issues will not be resolved in a timely fashion for project to proceed as currently proposed.

As an alternative course of action it is suggested that the maintenance project be scaled down from the authorized project dimensions and only that width and depth be achieved which will alleviate the immediate and significant navigation hazards for existing users. Selective dredging as above could produce upwards of 100,000-125,000 cubic yards of material which could be disposed of by point dumping at the Central Long Island Sound Regional Disposal Area and carefully monitored to track its fate and to correlate bulk inventory and biological testing results on the material to be dredged with the material's behavior over time at the disposal site. The specific design of the monitoring and assurances regarding future cap materials, should of course be the subject of discussion by the Dredging Management Committee.

The preliminary proposal addressed land disposal opportunities for the original proposition and found that land opportunities were not sufficient to contain the material. Land disposal options should be looked at a-new in light of a scaled down project. More detailed attention should be given to the cultural/social impacts of land disposal sites. Most importantly, if land disposal is to be utilized my Office would require assurances that the site(s) be properly prepared to eliminate any potential for contaminants leaching ~~bulk~~ back into the waterway and that following dewatering that land sites be covered with suitable material to eliminate any public health and safety hazards.

Should you or members of your staff and our Dredging Management Committee wish to discuss my comments call me at 566-7160.

Sincerely,

Denis Cunningham
Assistant Director
Water Resources Unit

DC:jc

cc: NERBC - DMC
NYS - DEC
NMFS
EPA
USF & WL
ISC
USCG

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Services Division
Habitat Protection Branch
7 Pleasant Street
Gloucester, MA. 01930

March 3, 1981

Col. William E. Hodgson, Jr.
Acting Division Engineer
Department of the Army
Corps of Engineers
424 Trapelo Road
Waltham, MA. 02154

Dear Colonel Hodgson:

The National Marine Fisheries Service (NMFS) has reviewed the preliminary assessment package regarding the Black Rock Harbor maintenance dredging project provided at the New England River Basins Commission (NERBC) meeting in early December. As we told your staff at that NERBC meeting, NMFS finds much of the document to be well written, while displaying familiarity with most present day research and thinking. However, we believe the document could be improved by reviewing the following comments and modifying the assessment as necessary.

1. The last paragraphs on page 14 do not justify all three of the conclusion points drawn on the top of page 15. To the first point: Testing has shown "major accumulations" of some metals in some organisms. The second point may possibly be correct; however, testing performed by other districts has shown that bioaccumulation of pollutants is an ongoing occurrence. The release of heavy metals to the water in large volumes, noted in the final point, is related to dredging methodologies and chemical parameters which can be, by and large, controlled. It appears that this last point is a reasonable statement.

2. The discussion regarding petroleum impacts associated with sediments is inappropriate since it discusses inshore areas not offshore sites such as the disposal area. NMFS suggests that a review of the Arrow, Torrey Canyon, Argo Merchant and Amoco Cadiz spills would be more appropriate and informative. In the case of the Arrow spill, bunker "C" was mixed downward through the water column to depths of 80 meters and has been shown to have affected clam beds in offshore as well as near shore zones for more than eight years after the spill (Gilfillan and Vandermuelen, 1978). This would indicate that the presence of "weathered"

petroleum in sediments is a cause for concern. Southward and Southward (1978) have discussed similar impacts from the Torrey Canyon. That cargo was initially unweathered Arabian crude but over time became well-weathered, yet the impacts persisted. Perhaps the best studies and most comparable data come from Cabioch and his colleagues at the Roscoff Marine Laboratory in Brittany, France. They have studied and reported a severe and persistent decrease in certain offshore benthic flora and fauna following the Amoco Cadiz spill. That decrease occurred with a simultaneous marked increase in the persistent presence of weathered petroleum hydrocarbons in the sediments (Vandermeulen, 1980, Pers Comm.). Finally, the widely reported work of Longwell et al at the NMFS Milford Biological Laboratory on the impacts of coating and genetic disruption resulting from weathered Argo Merchant bunker "C" on eggs of pelagic finfish raises the potential likelihood of long-term adverse impacts from dredged materials having elevated levels of petroleum hydrocarbons. We suggest the New England Division consider these findings, particularly since it has been shown by DAMOS monitoring programs that disposal activities often act as a lure to pelagic and benthic fauna as well as associated fishing activities.

The nature of the industrial uses of Black Rock Harbor (asphalt and petroleum fuels handling rank high) and the test results, although erratic, indicate that in all three test species petroleum hydrocarbons will be bioaccumulated in quantity. In view of the findings noted above special handling of the sediments would appear appropriate.

The polychlorinated hydrocarbon (PCB) situation is so complex that we are drafting a NMFS discussion paper on this topic, which we hope to have completed in the near future. However, it is our opinion that the PCB levels are too high to simply allow open-water dumping of the material generated by maintenance dredging of Black Rock Harbor.

Finally, a brief note on asbestos appears in order. Bridgeport's Black Rock Harbor shoreline has for years been the site of only moderately contained asbestos dumping. The city has sought legal redress from the dumper(s) and has both federal and state monies involved in attempting to correct the problem. Although the presence of asbestos is not verified, the potential for such materials to be dumped, and later dispersed during storm events (as was some of the material from the Stamford-New Haven capping project) is unacceptable.

In summary, we are worried about:

1. Contamination from petroleum hydrocarbons.
2. Contamination from PCB.
3. Contamination from asbestos.
4. The advisability of using this material for the next step in advancing our collective understanding of open-water processes with regard to dredged material disposal.

Finally, our review (see enclosure) of the individual test results reveals shortcomings that give further cause for concern. Regardless of the testing shortcomings, however, ten of the fifteen tests performed show statistically significant differences in bioaccumulation when compared to reference sediments, and therefore indicate that this sediment is too polluted to be considered for open-water disposal. In view of that conclusion we recommend that the material generated by the dredging of Black Rock Harbor receive a level of special handling commensurate with the displayed level of toxicity found in those sediments.

Sincerely,

Ruth Rehfus

Ruth Rehfus
Acting Branch Chief

Enclosure

Literature Cited

1. Gilfillan, E.S. and J.H. Vandermeulen. 1978. Alterations in growth and physiology in soft shell clams, *Mya arenaria*, chronically oiled with Bunker C from Chedabucto Bay, Nova Scotia, 1970-1976. J. Fish. Res. Board of Can. 35:630-636.

2. Southward, A.J. and E.C. Southward. 1978. Recolonization of rocky shores in Cornwall after use of toxic dispersants to clean up the Torrey Canyon Spill. J. Fish. Res. Board of Can. 35:682-706.

3. ___________ 1977. Ecological evaluation of proposed discharge of dredged material into ocean waters. Implementation Manual for Section 103 of Public Law 95-532. Env. Effects Lab. WES. Vicksburg, Miss.

BLACK ROCK HARBOR PROJECT, CONNECTICUT

Comments on Test Procedures and Results

To start this discussion, a series of questions that might help in interpreting the solid phase bioassay and the bio-accumulation test results appears necessary.

1. Does Manchester, Massachusetts, have a pollution problem? The test organisms appear to have high "background levels".

2. In line with question Number 1, what are the initial levels of pollutants in the test organisms? What size(s) of organisms were used? This is important to the understanding of the level of potential accumulation and thereby the impact of the proposed action.

3. What is known about the pedigree of the reference sediments collected November 21, 1979? Without knowing if the material has "...sedimentological characteristics similar to the disposal site... as if no disposal had ever taken place there" (EPA and Corps, 1977), comparability is not possible.

4. How was it determined that the Black Rock Harbor sediment complies with section 227.5 (prohibited materials) of the "Ocean Dumping Regulations"?

5. Why was the test sediment only surficially sampled with a Van Veen grab rather than cored to project depth?

6. What do the records of the "...obvious mortality, formation of tubes or burrows and unusual behavior patterns of animals" reveal about the organisms during the testing? How long was each observation?

7. In the solid phase test results the mean survival of grass shrimp is given as 85.0 - 93.0%. We find it to be 88.7% or statistically different as well as significant when compared to the controls.

8. Why were the species groups combined for statistical analysis when it was well known that the area is heavily polluted and the implementation manual at page F11, paragraph 24 clearly indicates that such a procedure lacks sensitivity?

9. The consultant's testing methodology needs a close review. We read their procedure (supplied in Appendix A of the results) to indicate that either the worms, clams and shrimp were all placed in the same aquaria or the three sediments were homogenized and the identification of samples A, B and C are subsamples of the homogenized total. Which is it and why was it done that way?

There are additional questions concerning the test results themselves, particularly the bioaccumulation raw data levels. It is very important to keep in mind the ninth point above, regarding what was actually tested and in what form that testing took place. These concerns need resolution and bear heavily on the character of the data. Again, a few introductory points seem appropriate.

1. We believe that the deviations in the test results reported by the Laboratory create a very low confidence level in the reported ranges of the results.

2. Our research staff indicate that the limits of detection for mercury and cadmium using an atomic absorption spectrometer (AAS) reported by the laboratory are below accepted ranges.

3. The specific "PCB's" which were tested for and the peaks which were used as deterministic need to be discussed. We have found a masking effect from DDE (DDT metabolite) and certain fractions of the PCB family when using an AAS identification system.

Due to lack of specific explanations regarding which procedures were followed by the testing laboratory, we have hypothesized the following scenario of events for reference and control organisms undergoing testing. At the end of the ten days of bioassay testing all surviving species representatives were gut purged, collected into a single species sample and evenly divided for metal and organic testing. All appropriate precautions were made to avoid contamination. It should be realized that the laboratory reported that all control and reference organisms were held on sediments which were homogenized from central sources and therefore should have shown a high level of comparability during testing. The species representatives were homogenized after that division and prepared for chemical testing. Why when, in view of this uniformity of exposure and handling, do the results of the tests on those subsamples vary by up to five orders of magnitude? Perhaps more appropriately, why, when dealing with five replicate subsamples, are we frequently offered four results that show good to excellent comparability and one that is disturbingly out of range of the others, yet is included in the statistical analysis?

A review of the test results displays this problem. Beginning with the mercury results for grass shrimp, in the first replicate of the reference sediment we see a discrepancy of comparability with the other samples of virtually a full order of magnitude. In the PCB analysis on control sediment impacts in grass shrimp a four order variation is presented and later used for statistical assessment. The reference sediments in this same series show a two order variation. Finally, the petroleum hydrocarbon test on control grass shrimp varies by five orders of magnitude in one test case, yet it was included in the analysis with the others which were at the limits of detection. While we realize that preparation techniques may cause some problems in this latter instance, we would hope that a retest would be considered at the time of running the widely divergent subsample.

Using these widely divergent and/or erratic data points in the subsequent statistical analysis of the tests so confuses the actual findings that the assessment process is defeated prior to its implementation. Only by going back to the actual data points can one begin to understand what has occurred in the tests and what we might expect from open-water disposal of the tested materials. Incidentally, a review of the statistical analysis, while showing that the mathematical manipulation of the data is correct, does not reveal if reasonable common sense was used in the selection of data points to be analyzed.

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
ECOLOGICAL SERVICES
P.O. Box 1518
Concord, New Hampshire 03301

MAR 4 1981

Ref: NEDOD-N

Colonel William E. Hodgson, Jr.
Deputy Division Engineer
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Colonel Hodgson:

We have reviewed the preliminary environmental assessment for the maintenance dredging of Black Rock Harbor, Bridgeport, Connecticut.

The project involves dredging 425,000 cubic yards of material with disposal at the Central Long Island Sound Regional Disposal Area. Of the 425,000 cubic yards of proposed dredged material, approximately 315,000 cubic yards is classified as Class III material in accordance with the Interim Plan for the Disposal of Dredged Material from Long Island Sound, the remaining material is classified as Class I and II. The Corps proposes that the Class III material from Black Rock be enclosed behind a triangular berm to be constructed from Class I and Class II sediments from the same project, as well as additional material from other projects. The berm would be completed over a 5-10 year period, during which time the uncapped Class III material would be monitored to evaluate the impacts of an exposed deposit of Class III sediments. It is the position of the Corps that this proposal is consistent with the guidelines of the Interim Plan. It is our opinion that it is not consistent.

We do not agree with the Corps' conclusion that the results of the bioassay/ bioaccumulation tests indicate that the sediment can be disposed of without significant adverse impacts to the marine environment. The results of the bioassay/bioaccumulation tests indicate that the proposed dredge material is unsuitable for open water disposal.

In the solid phase bioassay, the survival of grass shrimp (*Palaemonetes pugio*) was 89 percent in the reference sediment, 93 percent in Sample A, 88 percent in Sample B and 85 percent in Sample C. These relatively low survivals are cause for concern. In addition, the 89 percent survival in the reference sediment is greater than 10 percent, therefore, the solid phase bioassay should be rerun.

The bioaccumulation tests results showed a significant bioaccumulation of PCB's in hard clams (Mercenaria mercenaria) and sandworms (Nereis virens), DDT in hard clams and sandworms, and petroleum hydrocarbons in sandworms. The results for petroleum hydrocarbons do not indicate the fractions of the generic group, petroleum hydrocarbons, that were analyzed. This information is needed for interpreting the bioaccumulation results for petroleum hydrocarbons.

We continue to object to the use of two controls in the bioassay/bioaccumulation tests. We also question the use of a Van Veen grab to collect dredge material samples rather than a core to project depth. Sampling the vertical as well as horizontal distribution of the proposed dredged material would give a better characterization of the dredged material.

In view of the location of this channel next to the Bridgeport sanitary landfill and the history of disposal of industrial wastes, such as asbestos, we recommend that a toxic scan be performed on the channel sediments. This toxic scan should be for the 65 pollutants designated as toxic under Section 307(a)(1) of the Clean Water Act.

The results of the bioassay/bioaccumulation tests indicate to us that the sediments from Black Rock Harbor are unacceptable for open water disposal.

The Corps states that a total evaluation of the project shows that no significant adverse impacts would result and, therefore, an Environmental Impact Statement is not required. We disagree and feel that an Environmental Impact Statement is needed for this project. The Corps refers to the programmatic Environmental Impact Statement for dredged material disposal in Long Island Sound and the Long Island Sound Containment Study. Since neither of these efforts will be completed in time to be considered in formulating this project proposal, the Corps is operating without fully investigating the impacts or alternatives to this proposal.

The Corps presents an investigation of upland disposal and contained shallow water disposal. The analysis was limited to the immediate project area. We recommend that the investigation of alternative disposal sites be expanded beyond the immediate project area. A site or combination of sites of at least 30 acres is reportedly needed to contain the disposal of the 425,000 cubic yards of dredged material. We suggest that the Corps rigorously re-evaluate the need to dredge the channel to authorized 18-foot depth based on the needs and use of the industries that utilized the channel. Based on the figures presented in the proposal, 67 percent of the commerce tons were transported in vessels with drafts of 13-feet or less and 32 percent of the commerce tons were transported in vessels with drafts between 14- and 15-feet. Only one trip was made by a vessel with a draft of 16-feet. By reducing the depth of the channel, the amount of dredged material would be reduced and other disposal options may become more viable.

We find the Corps' proposed management plan unacceptable. It appears to be seriously flawed in terms of adequate safeguards for keeping the dredged material in place. The Corps states that they expect that the depression within the triangular berm can be completed within 5-10 years culminating with the material dredged during the Bridgeport and New Haven Harbor improvement projects. We question two points of this statement. First, it would be prudent to create the depression before the Black Rock sediments were dumped. While we are waiting the 5-10 year period for the depression to be built around the Black Rock sediments, they may be moved by severe storms, as has happened previously with the Stamford/New Haven mound. Second, we question the dependence on the Bridgeport and New Haven Harbor improvement projects as a source of sediment to complete the depression. There is no guarantee that either of these projects will ever be built. The New Haven project is in Stage 3, review of the draft feasibility study. The Bridgeport project is in Stage 2, development of alternative plans. In addition, the Bridgeport sediments may be polluted and unacceptable for open water disposal.

The Corps further states: "If monitoring of the Class III Black Rock Harbor sediments indicates that capping is needed, there are several possible sources of cover material. While this material is not immediately available, there is the potential to provide necessary cover through proper management of disposal at the site. There are active permits issued to many concerns for dredged Class I material with disposal at the Central Long Island Sound Disposal Area. The total volume of material that could come from these projects is 125,000 cubic yards. Another source is the Federal channel in New Haven Harbor where there is a maintenance backlog amounting to approximately 300,000 cubic yards based on 1978 survey. This is Class II material similar to that used for one of the previous capping operations at the disposal site."

This statement raises further questions. There is no discussion of timing. How long would it take to cap the Black Rock sediments if it was decided capping was necessary? We question the adequacy of 425,000 cubic yards as cap for 315,000 cubic yards. With the exception of the Stamford/New Haven North Site, which was a sand cap, other capping procedures at the Central Long Island Sound Disposal Area have involved a greater ratio of capping material.

In conclusion, we consider the proposed management plan as unacceptable. Review of the bioassay/bioaccumulation tests indicates that the material is unacceptable for open water disposal. We are ready to work with the Corps on alternate disposal options. Please keep us informed as planning progresses on this project.

Sincerely yours,

Gordon E. Beckett

Gordon E. Beckett
Supervisor

STATE OF CONNECTICUT

DEPARTMENT OF ENVIRONMENTAL PROTECTION

COASTAL AREA MANAGEMENT PROGRAM

March 11, 1981

Mr. V.L. Andreliunas, Chief
Operations Division
New England Division, Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

RE: Black Rock Harbor Navigation Project-Bridgeport, Connecticut

Dear Mr. Andreliunas:

As you are aware section 307(c) of the Coastal Zone Management Act and Federal Regulations (15CFR 930.1ET SEQ.) require that federal activities, such as the maintenance dredging and disposal project proposed for Black Rock Harbor, be determined to be consistent with Connecticut's approved Coastal Area Management Program. Although you have not, at this time, sought the concurrence of my office on the consistency of this project, due to the preliminary state of its development, I am writing to inform you of our position in this regard and to advise you of the issues which we believe need to be resolved prior to our concurrence. First, and foremost I should note that on review of Mr. Cunningham's letter of March 3, 1981 I find that we are in agreement with a majority of the concerns raised. However, his correspondence did not indicate the link between the project, coastal management consistency and the New England River Basins Commission;s "Interim Plan for the Disposal of Dredged Material in Long Island Sound."

Connecticut's Coastal Management Plan specifically designates open water disposal sites as areas of particular concern. Subsequently, it makes reference to the "Interim Plan" as the management mechanism through which decision making on federal dredging and disposal projects will be developed. I should note that the role of the dredged management committee with respect to this plan is not that of a decision making body with authority to approve or disapprove projects by concensus, but rather it is established to function as a forum for raising and discussing problems of and related to dredging and disposal in Long Island Sound. Since one of the principal goals of our program is to coordinate Federal/State decision making <u>process</u> (as opposed to decisions themselves) we continue to believe that the NERBC forum should be used for such purposes.

With respect to the management scheme proposed (i.e. uncapped, diked disposal of the "Class III" materials) we continue to believe that this scheme represents a disposal and monitoring experiment which is at this time, unwise, particularly in light of the scale of the project and the level of development of monitoring procedures and their ability to detect impacts. In this vein, perhaps some smaller scale controlled, uncapped disposal could be explored as a logical next step to the Stamford/New Haven capping project.

Phone: (203) 566-7404
71 Capitol Avenue • Hartford, Connecticut 06115
An Equal Opportunity Employer

In light of these concerns and the apparent need for additional discussion of the disposal and management strategies we believe that our determination of consistency on this project should be held until all of Connecticut's concerns can be resolved.

Should you have any questions or comments regarding this letter or its content please contact me.

Thank you for your consideration.

Very truly yours,

R.H. Leach

R.H. Leach
Principal Environmental Analyst

RHL/el

CONSUMERS

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BPT. 333-3123
DAN. 748-7418

25752

March 20, 1981

Mr. Francis Donovan
Department of Army
Northeast Division
Corps of Engineers
424 Trapelo Road
Waltham, Mass. 02254

Dear Mr. Donovan:

This is to emphasize the need for dredging of the Creek Channel, Bridgeport, Connecticut and soon.

There has developed a shallow spot off the Bridgeport City land fill site, and general filling of the entire channel. Delay in dredging could create problems.

We are especially concerned to avoid an incident which might cause oil spill and pollution problems.

Our traffic on the Creek consists of 25 to 35 barges of heating oil. Any interruption of traffic during the heating season could cause hardship to industrial and household consumers.

I understand that the project was where it could go forward this summer. I urge that it be completed this year.

Very truly yours,

CONSUMERS FUEL, INC.

Ernest A. Wiehl, Jr.
President

EAW/l

Hi-Ho

D'ADDARIO *Industries*

513 BOSTON AVENUE
BRIDGEPORT, CONN. 06610
(203) 333-9488

March 20, 1981

Department of the Army
New England Division
Corps of Engineers
424 Trapelo Road
Waltham, MA 02254

Re: Cedar Creek, Bridgeport, Ct.

Attention: Mr. Fran Donovan

D'Addario Industries owns and operates an oil terminal and docks which are served by barge traffic on the subject stream. It is important to our oil business and the customers whom we serve that this stream remain open to the barge traffic. Currently, the stream is badly in need of dredging in order that barge traffic to our oil terminal can be maintained.

We strongly recommend to the Corps that this dredging project be given high priority for construction and cite the following reasons that are pertinent to your decision:

1. D'Addario Industries requires as much as two barge deliveries per month to sustain its operation.
2. The existing condition of Cedar Creek jeopardizes each barge trip thereby increasing the pollution potential to Long Island Sound.
3. The availability of oil to the D'Addario Terminal is vital to the Greater Bridgeport Area and dredging is required to accomodate barge traffic.

We sincerely hope you give these serious matters your greatest consideration in deciding the fate of Cedar Creek.

Very truly yours,

F. Francis D'Addario
Owner

FFD/lg

Established 1927

POLING TRANSPORTATION CORPORATION
70 PINE STREET
NEW YORK, N. Y. 10270

(212) 269-1150

March 24, 1981

Mr. V.L. Andreliunas
Chief, Operations Division
Dept. of the Army
New England Div. Corp of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Mr. Andreliunas:

We the Poling Transportation Corporation earnestly solicit your help and cooperation in the maintenance of the Federal Channel in Black Rock Harbor and Cedar Creek.

We run this channel often to service the oil terminals on this waterway and we have to be very careful operating this waterway because of the shoaling that is constantly accumulating.

We look to you for your assistance in making this waterway a safe place to navigate.

Very truly yours,

John P. Alban

John P. Alban
Operations Manager

JPA/pc

Inland Fuel Terminals, Inc.

STORAGE AND WHOLESALE — DISTILLATE AND RESIDUAL FUELS

TERMINAL LOCATIONS
ROUTE 111, MONROE, CONN.
215 ADMIRAL ST., BRIDGEPORT, CONN.

154 ADMIRAL STREET
BRIDGEPORT, CONN. 06605
TELEPHONE 367-3662

March 24, 1981

Department of the Army
New England Div., Corp. of Engineers
424 Trapelo Road
Waltham, Massachusetts 02254

Attention: Fran Donovan

Dear Fran:

I would like to relate to the Corp. of Engineers our concern for the necessity for dredging Black Rock Harbor as soon as possible.

Lately we have been experiencing more and more resistance from the tug captains concerning shallow areas of the channel. This is becoming extremely detrimental to our operation since they are starting to make our terminal a tide regulated delivery. We cannot insist that the barges and ships be brought in against their judgement for reasons of safety. If one of the barges or ships should hang-up on a shallow area, the results could be devastating.

Our wholesale terminal business has been increasing each year. The channel depth is of extreme importance. The proposed eighteen foot channel depth would only be just enough at this time, to accommodate the deep draft tugs, that are used in winter to break the heavy ice when making deliveries.

Your help in seeing this project through to an early completion is crucial if we are to survive in a business that requires barges and ships. If there are any questions, please do not hesitate to call me at any time.

Sincerely,

Donald F. Santa

Donald F. Santa

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DAN. 748-7418

March 27, 1981

Mr. Francis Donovan
Department of Army
Northest Division
Corps of Engineers
424 Trapelo Road
Waltham, Mass. 02254

Re: Bridgeport, Connecticut
Cedar Creek Channel

Dear Mr. Donovan:

Here is additional data with regard to the necessity for dredging Cedar Creek Channel.

Our present traffic consists of barges drawing 15 and 16 feet. We expect in the future to take 30,000 barrel barges which draw 17 feet. The tugs draw 12 feet.

Again I would like to state my hope that this project can be completed this year to minimize the possibility of traffic interruption, and accident or pollution damage.

Very truly yours,

CONSUMERS FUEL, INC.

Wiehl

Ernest A. Wiehl, Jr.
President

EAW/l
cc: Mr. Roy Clark

NEDOD-N   8 June 1981

Mr. Stanley Pac
Commissioner, Connecticut Dept. of
Environmental Protection
State Office Bldg.
165 Capitol Avenue
Hartford, CT 06115

Dear Mr. Pac:

This letter is to request your comment on the project we have proposed for maintenance of Black Rock Harbor. After considerable discussion among our staffs and members of the Dredging Management Committee of NERBC, we have re-formulated our plan, and must now begin to move ahead if there is to be a possibility of beginning this year.

Of the reservations expressed by some members, two of the most notable are addressed here. One is concerned with the dimensions essential to provide safe navigating conditions in Black Rock Harbor and the second concerns the disposition of material which is not capped.

A review of project use indicates that there are two active terminals located at the upper end of the project; Crowley Terminal on the west branch and Inland Fuel Terminal on the east branch. Crowley Terminal services Consumer Petroleum and D'Addario Industries. Santa Fuel is the sole user of the Inland Fuel Terminal. Inclosed are letters from the project users. During 1980, our waterborne commerce records indicate that petroleum products were delivered to the two terminals by fifteen different barge and tug combinations and four small, self-propelled tankers. According to 1978 published statistics and later statistics which have not been formally compiled, these type vessels make approximately 100 trips and deliver approximately 200,000 tons per year. The tankers range in length from 253 to 290 feet and in draft from 12 to 14.1 feet. The breadth of these vessels is approximately 40 feet. The barges range in length from 215 to 323 feet, in draft from 11.3 to 15 feet, and in breadth from 40 to 52 feet. The barges are maneuvered up to the terminals alongside tugs which have breadths of approximately 30 feet and draw between 12 and 13 feet. This arrangement creates a combined width of 80 to 90 feet. A check with Poling Transportation, which makes a majority of the deliveries, indicates that the minimum channel width which they recommend would be 150 feet.

NEDOD-N
Mr. Stanley Pac

8 June 1981

The proposal to create a berm over time as a means of preventing migration of sediment may have complicated our original proposal. We did, in essence, intend to provide for an opportunity to evaluate the materials on the bottom over time, without capping. The main reasons were two-fold: one was inspired by the immediate lack of material acceptable for capping, and two, there had never been an opportunity over time to evaluate uncapped materials in this classification. We understand the concern over quantity, but must also face the reality that occasions will arise, as now, when immediate capping is not possible due to unavailability of suitable materials. Therefore, it is important to understand, what, if any, risk is involved. It must be apparent that we regard that risk as minimal or non-existent, or we would not propose the scheme.

Based on our records, discussion with the users, prospective use by deeper draft barges and the necessity to minimize the maintenance frequency, we recommend a channel 150 feet wide dredged to a depth of 17 feet plus 1 foot of overdepth. An estimate based on the 1978 survey for providing these dimensions is approximately 200,000 cubic yards. With a shoaling rate of between 15,000 and 20,000 cubic yards per year, an estimate of present yardage is 250,000 cubic yards for the entire project. This estimate is subject to change and will be revised within the next two weeks based on a survey which has just recently been completed and is now being plotted.

As it now stands, we would proceed to point dump Black Rock material working from the inner harbor outward. This will achieve to a degree a natural blanketing of materials which are readily available. In time, in the course of other dredging project operations, a blanket would be formed. The period intervening would provide the window during which we could evaluate the impact of Black Rock materials on the biota.

An ancillary question to the one of whether the project should proceed as outlined concerns the location of the disposal point. With the recent increase in maintenance requirements in the Western Sound, we have heard advocates for re-establishing a western LIS disposal site. I would appreciate your advice on the necessity for and efficacy of designating a new disposal area generally in accordance with the Ocean Dumping Criteria and information contained in the draft Programmatic EIS for Long Island Sound.

I would appreciate a response within a month's time on these and any other substantive issues which you wish to address.

Sincerely,

ANDRELIUNAS

Incl
As Stated

V.L. ANDRELIUNAS
Chief, Operations Division

CF: NERBC, Mr. Chuck Schwerin
141 Milk St., Third Floor
Boston, MA 02109

Poling Transportation Corp.
Mr. John P. Alban
70 Pine St.
New York, NY 10270

Mr. Ernest A. Wiehl, Jr.
President
Consumers Fuel, Inc.
808 Post Road
Fairfield, CT 06430

Santa Fuel, Inc.
Mr. Donald Santa
154 Admiral St.
Bridgeport, CT 06605

D'Addario Industries
Mr. F. Francis D'Addario
513 Boston Ave.
Bridgeport, CT 06610

National Marine Fisheries Service
Ms. Ruth Rehfus
Habitat Protection Branch
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Gloucester, MA 01930

Mr. Gordon Beckett
U.S. Fish & Wildlife Service
Ecological Services
P.O. Box 1518
Concord, NH 03301

Mr. Allen Ikalainen
U.S. Environmental Protection Agency
Special Permits Branch
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Dept. of Environmental Protection
Mr. Denis Cunningham
Assistant Director
Water Resources Unit
State Office Building
Hartford, CT 06115

Department of Environmental Protection
Mr. Robert H. Leach
Principal Environmental Analyst
71 Capitol Ave.
Hartford, CT 06115

Reg. Br. - Dick Semonian
IAB - Del Kidd
Nav. Br. File

Black Rock Harbor

CONSUMERS

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DAN. 748-7418

June 11, 1981

Mr. V. L. Andreliunas
Chief, Operations Division
Department of Army
Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02254

Re: Black Rock Harbor

Dear Mr. Andreliunas:

Thank you for sending me a copy of your letter to Mr. Stanley Pac.

We are anxious that no procedural obstacles delay this project. Now, Summer, is the time to do it so that Winter traffic can run without danger.

Your letter did not emphasize sufficiently, I feel, the importance of the traffic. The Crowley Terminal for instance, services in addition to Consumers and D'Addario numerous, perhaps 40, other fuel distributors delivering to households, businesses and municipalities throughout southwestern Connecticut. They include Kaufman, Mercury, Mitchell, Sadowy, Standard, Montonari, Devino, Branchville, Mercurio, etc.

Disruption of traffic due to failure to keep the channel to scheduled depth could create a widespread problem.

Spoil disposal I feel should not be allowed to become a stumbling block.

Relatively speaking this is a small project and the handling of spoil should be within the capacity of our responsible officials.

If I can help this along by writing to elected representatives please let me know.

Very truly yours,

CONSUMERS PETROLEUM OF CONNECTICUT, INC.

Ernest A. Wiehl, Jr,
President

A-16

EAW/l

Navigation - B, BLACK ROCK HARBOR

Inland Fuel Terminals, Inc.

STORAGE AND WHOLESALE — DISTILLATE AND RESIDUAL FUELS

TERMINAL LOCATIONS
ROUTE 111, MONROE, CONN.
215 ADMIRAL ST., BRIDGEPORT, CONN.

154 ADMIRAL STREET
BRIDGEPORT, CONN. 06605
TELEPHONE 367-3662

June 17, 1981

Mr. V. L. Andreliunas,
Chief, Operations Division
Dept. of the Army
New England Division Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02254

Dear Mr. Andreliunas:

I recently received a copy of a letter which you wrote to Stanley Pac, at Connecticut Department of Environmental Protection regarding the planned maintenance of Black Rock Harbor.

In the third paragraph of this letter you noted that Santa Fuel was the sole user of Inland Fuel Terminals.

A correction is necessary. Inland Fuel Terminals is a wholesale distributor serving not only Santa Fuel, but 51 other retail fuel oil dealers marketing their product in the Metropolitan Bridgeport Area as well as Danbury. In addition Inland also thru-puts #2 oil for the customers of the Mobil Oil Company and Exxon. There are 15 customers of these two companies who are being serviced at our Terminal.

The reason for this note is to emphasize that 67 companies at our Terminal are dependent upon the proper maintenance of this waterway.

I am hopeful that this project will go forward this summer.

Sincerely,

George Santa

S. George Santa
President

SGS/lt

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

July 6, 1981

Mr. V. L. Andreliunas, Chief
Operations Division
New England Division
Corps of Engineers
424 Trapelo Road
Waltham, MA 02254

Re: Black Rock Harbor
Maintenance Dredging

Dear Mr. Andreliunas:

This is in response to your 8 June 1981 letter outlining a revised proposal for disposal of dredged materials from the Black Rock Harbor Navigation Project. Your original proposal called for restoring full authorized project dimensions by dredging approximately 425,000 cubic yards of material. Your revised proposal calls for maintenance of a smaller channel, 100 to 150 feet wide, and 17 feet deep (plus one foot over-dredge) which would produce approximately 250,000 cubic yards of material. The revised project dimensions are based on your data for current users supplying the two terminals at the upper reach of the channel.

The proposed disposal strategy calls for dredging from the north toward the south to enable the more contaminated sediments to be covered over with cleaner sediments in the course of point dumping at the Central Long Island Sound Regional Disposal Site south of New Haven Harbor.

The test results on the sediments to be dredged indicate they are contaminated with a variety of substances and that the material has a potential for adversely impacting the environment at the proposed open water disposal site. Accordingly, it is suggested that alternative land disposal options, specifically locations A and B in your preliminary proposal of December 1980, be re-evaluated in light of your decision to reduce the scope of the project. It should be noted that the dredged materials, if disposed of on land at sites A and B, could be put to a productive use following dewatering, as cover material at the adjacent sanitary land fill. The size of these land disposal areas appear to be sufficient to contain most, if not all, of the materials to be dredged under the revised proposal. The availability of the dredged material for cover at the Bridgeport Land Fill would be an added public benefit which should be fully evaluated by your office.

An additional option should be explored, that of partitioning disposal of the project between the available land and the open-water site. While two disposal modes would require two types of dredge plants and therefore additional costs, the benefit in obtaining definitive field information on the environmental

Phone:

State Office Building, Hartford, Connecticut 06115

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consequences of delayed capping of "worst case" material may outweigh these costs. As suggested in Mr. Cunningham's March 3rd letter to you, a 100,000 to 125,000 cubic yard open-water disposal operation with monitoring is reasonable and would provide valuable information on the handling of Class III dredged materials. It may provide the additional benefit by enabling authorized project dimensions to be fully restored.

Sincerely,

Stanley J. Pac

Stanley J. Pac
Commissioner

SJP/DC/dr

cc: National Marine Fisheries Service
U. S. Fish and Wildlife Service
U. S. Environmental Protection Agency

2XD

NEDOD-N

Donovan/jr/322
26 August 1981

Mayor John C. Mandanici
City Hall
45 Lyon Terrace
Bridgeport, CT 06604

Dear Mayor Mandanici:

Maintenance dredging is being considered for the Black Rock Harbor Federal navigation channel. In preparing an environmental assessment for the project, we made a preliminary evaluation of the open areas in the vicinity of the harbor that might be used for on-land or in-water disposal of the sediment to be dredged. These sites are described and located on the inclosures.

Our evaluation concluded that for a variety of reasons including insufficient volume capacity and diking or bulkheading problems, the sites were unacceptable. Therefore, we recommended open water disposal in Long Island Sound. Despite that recommendation, the State DEP has asked us to reevaluate land disposal possibilities even if it were for only a portion of the material to be dredged. Specifically, I would appreciate the city's position on the use of sites A, B and C and the possible use of this dredged sediment as cover material for the landfill site. The material to be dredged is primarily fine organic silt. For your information I have inclosed the results of bulk sediment analyses to provide you with information on grain size and chemical contamination.

This matter has been discussed with Mr. Crispino of your staff. If you have any questions please contact Mr. Fran Donovan at (617) 894-2400, extension 322.

Sincerely,

Incls
as

C.G. BOUTILIER
Chief, Navigation Branch

Ch/Nav. Br.,

cc: Mr James Crispino
City Hall, Room 212
45 Lyon Terrace
Bridgeport, CT 06604

Nav. Br. File

SECTION 404(b) FACTUAL DETERMINATION

AND FINDING OF COMPLIANCE

FOR

BLACK ROCK HARBOR

MAINTENANCE DREDGING

BRIDGEPORT, CONNECTICUT

SECTION 404(b) FACTUAL DETERMINATION
AND FINDING OF COMPLIANCE
FOR
MAINTENANCE DREDGING BLACK ROCK HARBOR
BRIDGEPORT, CONNECTICUT

1. References

a. Section 404(b) of Public Law 92-500, as amended, Clean Water Act.

b. 40 CFR Part 230 Subparts B,C,D,E,F,G, and H dated 24 December 1980.

c. EC-1105-2-104 Appendix C, dated 30 September 1980.

2. The Proposed Plan

Maintenance dredging is proposed for the Federally authorized Black Rock Harbor-Cedar Creek navigation channel in Bridgeport, Connecticut. The authorized channel dimensions are 18 feet deep at mean low water (mlw) and 100 to 200 feet wide from the 18-foot depth contour in Black Rock Harbor to the heads of both the east and West branches of Cedar Creek. The channel will be maintained to a depth of 17-feet, with the 200-foot wide areas being reduced to 150 feet. The existing 150 and 100 foot wide areas will not be changed. Approximately 210,000 cubic yards of material will be removed from this channel. Additionally, approximately 30,000 cubic yards of material will be removed from the western half of the 25-foot anchorage in Bridgeport Harbor to provide a depth of 35 feet mlw throughout.

In conjunction with this dredging proposal, the Environmental Protection Agency, Environmental Research Laboratory Narragansett will participate in a joint research program (Field Verification Program (FVP)) with the New England Division and the U.S. Army Engineer Waterways Experiment Station to apply newly developed environmental risk assessment procedures in the management and disposal of dredged materials in the marine environment.

Dredging in the Black Rock-Cedar Creek channel will be accomplished by both hydraulic and clamshell dredges. The hydraulic dredge will pump approximately 10,000 to 15,000 cubic yards of material into a 1-1/4 acre tidal flat/cove area to be confined by a bulkhead. The material will come from various locations along the channel starting opposite from Burr Creek to just downstream of the confluence of the east and west branches of Cedar Creek. A clamshell dredge will remove approximately 70,000 cubic yards of material from this same portion of the channel. The sediment would be placed in scows and point dumped at a selected location in the northeastern portion of the Central Long Island Sound disposal area. The resultant pile will not be capped or covered by other material and will be the focal point of aquatic disposal studies of the FVP. The remaining areas in the channel, the material from Bridgeport Harbor and the privately dredged sediments, will also be dredged by a clamshell dredge and the material point dumped at a different location within the Central LIS site. The deposit created by this disposal action will be capped by material dredged from another Federal navigation project, either outer New Haven Harbor or the mouth of the Connecticut River. Disposal and capping of this pile may be the subject of a capping study which could be incorporated into the FVP. Ongoing analysis of the Black Rock Harbor-Cedar Creek sediments will determine whether or not the capping study is feasible. If not this deposit would be included a part of the Corps of Engineers customary monitoring of the site under the DAMOS program.

3. Project Authority and Present Status

The Black Rock Harbor-Cedar Creek navigation channel was authorized by the River and Harbor Act of 1930 (House Document 281, 81st Congress).

The Bridgeport Harbor anchorage and navigation channel was authorized by the River and Harbor Act of 1958 (House Document 136, 85th Congress).

Upon completion of public review of the Environmental Assessment and Section 404 Evaluation, plans and specifications for construction would be initiated. Construction of bulkhead is scheduled to begin in September 1982. Weather permitting, hydraulic dredging would start in early winter of 1982. If postponed, it will be accomplished very early in the spring of 1983. Clamshell dredging would start early in the spring of 1983.

4. Environmental Concerns

Impacts associated with the discharge activity would not be significant. Flushing patterns within the harbors and at the Central Long Island Sound dump site should dilute any toxic effluents to existing conditions. Impacts of turbidity on benthic deposit feeders, filter feeders and finfish would be minimal and short term. The use of a clamshell dredge will minimize exposure of the sediments with the water column. The disposal of dredged sediments would bury any benthic organisms at the disposal areas. Recolonization of opportunistic species would occur soon after disposal is completed. No endangered or threatened species would be affected by the discharge activity. At the upland disposal site, an adjustable weir will be installed in the bulkhead to permit placement of the dredged material to varying elevations to provide both upland and wetland habitat. Following placement of the dredged material, the weir will be set at an elevation that permits tidal flushing. The proposed FVP study would monitor potential bioaccumulation impacts at both disposal areas for a five year period after disposal. Mitigation measures, such as capping, would be initiated if adverse impacts are detected.

5. Restriction on Discharge (Section 230.10)

(a) There is no practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem and be capable of achieving the basic purpose of the proposed project. A "No Action" alternative is not, by definition, practicable since this would contribute to continued shoaling increases in costs, and increases in potential groundings with the possibility of oil spills.

(b) After taking into consideration disposal site dilution and dispersion, the discharge activity would not violate any applicable State water quality standards or any applicable toxic effluent standard or prohibition under Section 307 of the Clean Water Act. Any violations that may occur would be temporary and localized until flushing patterns within the harbors dilute any toxic levels to existing conditions and at the Central Long Island site dilute any toxic effluents to levels which are not toxic. The discharge activity would not jeopardize the continued existence of species listed as endangered or threatened under the Endangered Species Act of 1973, as amended, and would not destroy or adversely modify habitat determined to be critical under the Endangered Species Act of 1973, as amended; and would not violate any requirement imposed to protect any marine sanctuary designated under Title III of the Marine Protection Research and Sanctuaries Act of 1972.

(c) Any degradation of waters of the United States due to the discharge activity would be temporary and local, and would not be significant. There would be an adequate volume of available water at the disposal sites for dilution of effluents to existing conditions.

(d) Appropriate and practicable steps would be taken to minimize any potential adverse impacts of the discharge in the aquatic ecosystem. A five-year integrated laboratory and field research program has been designed in conjunction with this project to apply newly developed environmental risk assessment procedures in the management and disposal of dredged materials in the marine environment.

6. Findings of Compliance (Section 230.12)

(a) Upon review of these guidelines (Subparts C through G), the proposed disposal sites for the discharge of fill material have been specified as complying with the requirements of these guidelines.

(b) A factual determination required by Section 230.11 with respect to disposal of fill material and potential environmental impacts resulting from such disposal is presented on page . Concomitant reading of or adequate familiarity with Section 404(b) Guidelines will insure understanding of results presented in the factual determination.

7. Conclusions

(a) An ecological evaluation has been made following guidance in 40 CFR 230, Subparts B through G. Subpart H was reviewed to determine applicability to the proposed project.

(b) Appropriate measures have been identified and incorporated in the proposed plan to minimize adverse impacts on the aquatic environment as a result of the discharge.

(c) Consideration has been given to the need for the proposed activity, the availability of alternate sites and methods of disposal that are less damaging to the environment, and such water quality standards as are appropriate and applicable by law.

(d) Maintenance dredging of the Black Rock Harbor-Cedar Creek navigation channel and the western half of the anchorage area in Bridgeport Harbor would require the discharge of fill material. Impacts on the aquatic environment would be temporary and localized. There would be an adequate volume of available water at the Long Island Sound disposal sites for dilution of effluents to nontoxic levels. Dredging is necessary to insure continued safe access and navigation in the Black Rock-Cedar Creek channel and in the Bridgeport Harbor anchorage area.

Statement

The proposed disposal sites for dredged material from the Black Rock-Cedar Creek channel and the Bridgeport Harbor anchorage area have been specified through the application of Section 404(b) Guidelines.

The project files and Federal regulations were reviewed to properly evaluate the objectives of Section 404(b) of Public Law 92-500, as amended. A public notice with respect to the 404 Evaluation will be issued accompanying this document. Based on information presented in this Section 404 Evaluation, I find that the project will not result in unacceptable impacts to the environment.

7 July 1982
DATE

C.E. Edgar III
C.E. EDGAR, III
Colonel, Corps of Engineers
Division Engineer

FACTUAL DETERMINATION

230.11(a) Physical Substrate Determination

The proposed discharge activity would not significantly change the characteristics of the substrate at the proposed discharge sites.

The fill material is composed primarily of medium to fine sandy organic silts, and is similar to that found at the Central Long Island Sound Disposal site where the materials are composed of dredged silt sediments. Discharge of dredged material at this location would not significantly change the present character of the dump site sediment since the area has been used as a dump site for a number of years. The dredged material would be point dumped and the cohesive nature of the material would minimize movement of the discharged material. The point discharge would mound the harbor sediments and increase the elevation of the dump site. Current velocities are not great enough to cause significant movement of the discharged material. The use of a clamshell dredge would minimize the mixing of sediments within the water. Although disposal would bury any benthic organisms at the dump site, the disposal mound would be recolonized by opportunistic species soon after disposal is completed.

The proposed discharge from the hydraulic dredge would not significantly change the substrate at the tidal cove area along the channel. The dredge material is composed of medium to fine sandy organic silts, similar to that of the proposed discharge site. The elevation of the tidal mud flat would be increased. An adjustable weir will be installed in the bulkhead to permit placement of the dredged material to both upland and wetland (intertidal) elevations and to allow for tidal flushing of the wetland portion of the area. The existing mud flat and its associated biota would be buried by the dredged material. However, the new substrate would provide suitable habitat for populations of invertebrates which would provide a food source for shorebirds in the area.

The proposed project would not involve dredge or fill activities in any wetlands.

(b) Water circulation, fluctuation, and salinity determination

Flushing patterns within the tidal cove area would be altered and rates would be reduced because of the restriction by the bulkhead. This change is not expected to be significant. There would continue to be some exchange of water in and out of the wetland portion of the disposal area. Flushing patterns within the harbors would be increased because of the dredging activities.

There would be no significant change in water circulation or current patterns in the proposed discharge area at the Central Long Island Sound dump site. It is an open water habitat and is an established disposal area with existing mounds.

Normal water fluctuations and salinity gradients would not be altered by the proposed discharge.

(c) Suspended particulate/turbidity determination

Suspended particulate and turbidity levels would temporarily increase at the Central Long Island Sound dump site due to discharge activities. A turbidity plume of fine loose and clumped material would be released into the water column. Increased turbidity levels would be short-term and localized. Turbidity levels would be minimized through the use of a clamshell dredge and by point discharge. Any increases in existing suspended particulate loads would be temporary.

There would also be a temporary increase of suspended particulate and turbidity levels at the tidal cove discharge area. Suspended particles would settle out soon after disposal; some fine sediments at the surface would be eroded by the tidal fluctuations. The increased turbidity in this area would be minimal and no long term impacts are expected.

The discharge activities would not violate such water quality standards as are appropriate and applicable by law.

(d) Contaminant determination

Discharge activity at the Central Long Island Sound dump site would introduce relatively higher levels of contaminants to the existing dump site sediments. Release of PCB's were above the 24hour average (0.03 ppb) (EPA, 1980). No guidelines have been established for an instantaneous release, although toxicity occurs above 10 ppb. Heavy metals and nutrients would also be released into the water column. The volume of available water at the site should continually dilute concentrations in the water column down to nontoxic levels and eventually existing conditions. Also, the use of a clamshell dredge would minimize mixing of sediments within the water, with only a small fraction of the dredge material escaping into the water column. Heavy metals would be absorbed onto suspended silt particles. There should not be significant contamination of the waters at the Central Long Island Sound site. Current velocities at the dump site are not sufficient enough to cause significant movement of the discharged material. Point dumping would reduce the availability of contaminated sediments to the surrounding waters.

Discharge activity from hydraulic dredging would also release contaminants into the tidal cove area. The bulkhead weir would allow for tidal flushing which should flush out and dilute contaminants to existing conditions.

(e) Aquatic ecosystem and organism determination

Discharge activities would not significantly disrupt the chemical, physical or biological integrity of the aquatic ecosystem. The food chain would not be significantly disrupted in such a manner as to alter or decrease diversity of plant or animal species.

Discharge activities may temporarily disrupt faunal movement but are not expected to significantly interfere with movement into and out of feeding, spawning, breeding or nursery areas. Potential impacts on shellfishery resources would be mitigated by off-season construction activities to avoid the spawning season. There would not be significant changes in current patterns, salinity patterns and flushing rates which could affect shellfish. Discharge activities are not expected to interfere with reproductive processes or cause undue stress to juvenile shellfish forms.

Discharge of fill would destroy those benthic organisms inhabiting the immediate disposal areas. The disposal mound at the Central Long Island Sound site would be recolonized by opportunistic benthic organisms soon after disposal. The tidal cove mud flat and its associated biota would also be buried by the discharge material. The new substrate would provide suitable habitat for populations of invertebrates which would provide a food source for shorebirds in the area.

Discharge of the dredged material would not significantly degrade through application of Sections 230.11(a) and (b).

Impacts of turbidity on benthic deposit feeders, filter feeders and finfish would be minimal and short term.

Elutriate, bioassay and bioaccumulation tests were conducted to determine the effect of the discharged material on communities or populations of organisms expected to be exposed to the discharge. These elutriate tests showed that release of PCB's were above the 24hour average (0.03 ppb) (EPA, 1980). The tests also showed that heavy metals and nutrients would also be released into the water column. Flushing patterns within the harbors and at the Central Long Island site should dilute any toxic effluents to existing conditions. Bioassay tests have indicated that disposal activities would not be toxic to organisms near the discharge areas. Bioaccumulation tests indicated potential uptake of certain sediment contaminants by clams and marine worms. The relative tissue levels in the clams were well below the U.S. Food and Drug Administration's Action levels for shellfish. Uptake by sandworms may be considered insignificant to the ecosystem based on the low level of uptake or the fact that the substrate has not been observed to magnify to higher trophic levels in the marine food chain.

(f) Proposed disposal site determination

Point dumping would minimize dispersion of material at the Central Long Island Sound dump site. Current velocities at the site are not sufficient enough to result in significant movement of the discharged material. The use of a clamshell dredge would minimize dispersion of material. Once released from the scow, the dredged material generally descends rapidly to the bottom.

Dispersion at the tidal cove area would be minimized by the presence of the bulkhead which would separate the site from the surrounding aquatic environment. An opening in the bulkhead would allow for tidal flushing of the disposal area.

There would be no changes in salinity patterns at either of the disposal areas.

(g) Determination of cumulative effects on the aquatic ecosystem

During discharge activities there would be cumulative effects due to the accumulation of sediments and sediment contained contaminants over the life of the project at both disposal sites. As a result, there would be associated effects of lowered dissolved oxygen levels in the sediments which would effect the benthic organisms at the site. There would be an instability in the benthic communities because the intermittent disposal operations will not allow the populations to reach a climax community. Populations will return to a stable condition after disposal operations are completed.

(h) Determination of secondary effects on the aquatic ecosystem

Run-off would occur through the bulkhead at the upland disposal site. This conditions will be monitored during the 5-year Field Verification Program (FVP).

There would be sporadic releases of contaminants into the water column through the activity of organisms in the sediments at the Central Long Island Sound open water site. Short-term bioaccumulation of contaminants would also occur. There would be a temporary loss of benthic productivity for predators which use these benthic populations as a food source. Discharge activities would be scheduled to avoid interference during spawning seasons.